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2d Session. } { No. 23.

REPORT

OF THE

DIRECTOR OF THE MINT

UPON THE

PRODUCTION

OF THE

PRECIOUS METALS IN THE UNITED STATES

DURING THE

CALENDAR YEAR 1895.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1896.

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TREASURY DEPARTMENT.
Document No. 1894.
Director of the Mint.

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LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
BUREAU OF THE MINT,
October 16, 1896.

SIR: I have the honor to submit herewith my report on the production of gold and silver in the United States for the calendar year 1895, together with that of other countries, compiled from official information furnished by foreign Governments and from other reliable but unofficial sources.

Respectfully, yours,

R. E. PRESTON,
Director of the Mint.

The SECRETARY OF THE TREASURY.

PART I.

PRODUCTION AND EMPLOYMENT, AND MOVEMENT OF GOLD AND SILVER IN THE UNITED STATES IN 1895, AND SURVEY OF THE WORLD'S PRODUCTION OF GOLD AND SILVER IN 1895.

GENERAL REPORT.

PRODUCTION OF GOLD IN THE UNITED STATES IN 1895.

The United States regained in 1895 the place it lost in 1894 as the chief gold-producing country of the world, its output of gold in the former year having exceeded that of 1894 by 343,947 ounces (or 10,698 kilograms) fine, of the value of $7,110,000. In 1895 the gold yield of the United States was 2,254,760 ounces (or 70,132 kilograms) fine, of the value of $46,610,000, while the yield of Australasia was 2,167,117 ounces (or 67,406 kilograms) fine, of the value of $44,798,300; of the Transvaal, 2,123,337 ounces (or 66,045 kilograms) fine, of the value of $43,893,300, and of Russia, 1,397,767 ounces (or 43,476 kilograms) fine, of the value of $28,894,400. The yield of gold from the mines of the United States in 1895 was greater than in any year since 1870, except in the years 1877 and 1878, when it amounted to $46,900,000 and $51,200,000, respectively. It constituted in 1895 23.3 per cent of the world's total production of that metal.

The method followed by the Bureau of the Mint in calculating the year's production of gold from the mines of the United States has been previously described in this series of reports. The gold produced in the country in any year goes part to the private refineries of the United States to be there refined, part to the mints and assay offices of the United States as deposits, while part is exported in gold ores and copper and argentiferous matte for reduction abroad. All these items are accurately ascertainable; their total constitutes the country's gold product of the year.

These several items are shown in the following table, which exhibits the gold product of the United States in 1895:

APPROXIMATE GOLD PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1895.

Items reported for 1895.	Fine ounces.
Domestic product in fine gold bars reported by private refineries	1,471,277
Unrefined gold of domestic production deposited at the mints and assay offices	782,587
Domestic gold contained in ores, copper matte, etc., exported for reduction	4,990
Total	2,258,854

It has been the custom of the Mint Bureau to verify the approximate correctness of the above table and the result reached as to the gold product of the year by a second table showing the disposition made of the domestic gold bullion and the auriferous domestic ores produced. That disposition is as follows: Part of the domestic bullion is disposed of at the mints and assay offices, being deposited at those institutions; part of it is exported; part is disposed of by private refineries to manufacturers and jewelers for use in the industrial arts; besides which, some gold is exported in domestic ores and domestic copper matte. An ascertainable amount of foreign gold bullion, however, is contained in the private refineries' product of fine gold bars deposited at United States mints and assay offices, and is by them classified as "domestic production." This foreign bullion must, of course, be deducted from the total amount of gold classified above.

The items of the disposition of the gold product of the mines of the United States is shown in the following table, constructed to test the correctness of the preceding one:

APPROXIMATE DISPOSITION OF THE GOLD PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1895.

Disposition.	Fine ounces.
Bullion deposited at the mints and assay offices classified as of domestic production	2,402,579
Domestic bullion, other than United States mint or assay offices bars, exported from the United States	25,077
Domestic gold in ores, copper matte, etc., exported	4,990
Bullion of domestic production reported by private refineries in the United States as having been made into bars for manufacturers and jewelers for use in the industrial arts	42,519
Total	2,475,165
Deduct foreign bullion reported to the Bureau of the Mint by private refineries in the United States as contained in their product of fine gold bars deposited at the mints and assay offices or entered at the custom-houses for exportation as of domestic production but derived from foreign ores	224,483
Net total	2,250,682

The result reached in either of the above tables is a close approximation to the actual gold production of the United States in 1895. A mean between them, or 2,254,760 ounces (or 70,132 kilograms) fine, of the value of $46,610,000, is as close an estimate of it as can be made, and it is accordingly placed at these figures in the table of the world's production of gold and silver in the present report.

The following table shows the total gold product of the United States in 1894 and 1895, shared by the several gold-producing States and Territories, and in what States and Territories there was an increase or decrease of production, as well as the amount of such increase or decrease.

TABLE SHOWING THE PRODUCT OF GOLD IN THE SEVERAL STATES AND TERRITORIES IN 1894 AND 1895, AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR.

State or Territory.	Value.			
	1894.	1895.	Increase.	Decrease.
Alaska	$1,113,550	$1,615,300	$501,750	.....
Arizona	1,784,475	1,965,300	180,825	.....
California	13,570,397	14,928,600	1,358,203	.....
Colorado	9,491,514	13,305,100	3,813,586	.....
Georgia	97,736	128,000	30,264	.....
Idaho	2,081,281	1,779,600	.....	$301,681
Michigan	44,444	42,900	.....	1,544
Montana	3,651,410	4,101,400	449,990	.....
Nevada	1,137,819	1,552,200	414,381	.....
New Mexico	567,751	492,200	.....	75,551
North Carolina	46,594	54,200	7,606	.....
Oregon	1,422,056	888,300	.....	533,756
South Carolina	97,839	128,400	30,561	.....
South Dakota	3,299,100	3,869,500	570,400	.....
Texas	.....	.....	.....	.....
Utah	868,031	1,373,000	504,969	.....
Washington	195,100	351,000	155,900	.....
Alabama				
Connecticut				
Maryland				
Minnesota				
Nebraska	30,903	35,000	4,097	.....
Tennessee				
Virginia				
Vermont				
Wyoming				
Total	39,500,000	46,610,000	8,022,532	912,532
Net increase	.....	.....	7,110,000	.....

The above figures are not those of the agents appointed to report to this Bureau the production of gold and silver in the several States and Territories; they represent the share of the total gold product of the year allotted each State and Territory by this Bureau according to all the information it possesses on the output of domestic gold, whether derived from the returns of private refineries, mints, and assay offices, records of exports, or reports of agents.

PRODUCTION OF SILVER IN THE UNITED STATES IN 1895.

The method employed in calculating the silver output of the country is similar in all respects to that used in calculating the production of gold, and needs no further description here.

The following table shows the approximate silver product of the mines of the United States in 1895:

APPROXIMATE SILVER PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1895.

Items reported for 1895.	Fine ounces.
Domestic product in fine silver bars reported by private refineries	53,490,128
Unrefined silver of domestic production deposited at the mints and assay offices	556,369
Domestic silver contained in ores, copper matte, etc., exported for reduction	1,614,387
Total	55,660,884

The following table shows the disposition of the silver product of the mines of the United States in 1895:

APPROXIMATE DISPOSITION OF THE SILVER PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1895.

Disposition.	Fine ounces.
Bullion deposited at the mints and assay offices classified as of domestic production	6,373,581
Domestic bullion, other than United States mint or assay office bars, exported from the United States (custom-house rating at commercial value $46,229,953, corresponding at average price of silver during the year to $0.654 per fine ounce)	70,688,000
Domestic silver in ores, copper matte, etc., exported	1,614,387
Bullion of domestic production reported by private refineries in the United States as having been made into bars for manufacturers and jewelers for use in the industrial arts	2,297,836
Increase in the approximate stock of silver bars, exclusive of any bars bearing the stamp of a United States mint or assay office, in the United States held by the Mercantile Safe Deposit Company and other institutions at the close of the calendar year 1895, according to information furnished the Bureau of the Mint	18,334
Total	80,992,138
Deduct foreign bullion reported to the Bureau of the Mint by private refineries in the United States, as contained in their product of fine silver bars deposited at the mints and assay offices or entered at the custom-houses for exportation, as of domestic production, but derived from foreign ores	25,198,378
Net total	55,793,760

The mean of these two results being, in round numbers, about 55,727,000 ounces, fine, of the coining value of $72,051,000 and the commercial value, at the average value of an ounce, fine, during the year, viz, $0.654—$36,445,000, represents the product of silver in the United States in 1895. The product in 1894 was 49,500,000 ounces. The increase of the output of silver in 1895 over that of 1894 was, therefore, 6,227,000 ounces, of the coining value of $8,051,071, and the commercial value of $4,072,458.

The increase in the production of silver in the United States in 1895 must be ascribed mainly to the increased production of copper in Montana and Utah—silver being a by-product. Thus, in Montana, out of

a total production of silver in 1895 of 17,569,100 ounces, fine, 8,828,146, or more than 50 per cent, were extracted from copper ores.

In the reports of the agents engaged to collect statistics on the gold and silver output of the several States in 1895, some attention was given under the instructions received by them this year from the Bureau, to the rate of wages paid to miners, mill hands, etc. It appears from these reports that there are great differences in wages in the several States and even in different parts of the same State, ranging as they did from 90 cents and $1 in some of the States of the South Appalachian Range, to $10 in the Yukon district in Alaska. Miners in Alaska receive $3.50 and millmen $4.50 in Unga Island. The average wages here were $2.85 per day, it being reduced by the smaller pay of laborers. In the Admiralty Island district, Alaska, wages were $2 to $3.50; in Silver Bow Basin and Sheep Creek districts, $3 per day, and in Juneau, $3.50 per day. In Arizona laborers get $1.50 to $2.50 per day and miners $3 to 3.50. There are great differences in the wages paid in California in the several counties. The general rate for experienced miners under ground, in the quartz and drift mines, is about $3 throughout the State, except in Mono County, where it is $4. Surface men in that State get $2.50 on the average, and laborers about $2. In some counties in California, and also in some other States, men are paid, with board, $35, $40, and $45 per month. Wages in Colorado average $3 per day. In Montana laborers receive $2.25 to $3 and miners $3.14 to $3.50. In Nevada the average wage is $3 per day; in New Mexico, $2.75 to $3; in Oregon, $2 to $3, and in Washington, $2 to $3.50. Chinese employed in the mines nowhere receive much more than one-half the wages paid to others.

The following table shows the total silver output of the United States in 1894 and 1895, and in what States and Territories there was an increase or decrease of production:

TABLE SHOWING THE PRODUCT OF SILVER IN THE SEVERAL STATES AND TERRITORIES IN 1894 AND 1895 AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR.

State or Territory.	1894.	1895.	Increase.	Decrease.
	Ounces, fine.	*Ounces, fine.*	*Ounces, fine.*	*Ounces, fine.*
Alaska	22,261	67,200	44,939	.....
Arizona	1,147,204	986,900	.....	160,304
California	717,368	653,700	.....	63,668
Colorado	23,281,399	23,398,500	117,101	.....
Georgia	325	400	75	.....
Idaho	3,288,548	3,110,600	.....	177,948
Michigan	35,122	37,300	2,178	.....
Montana	12,820,081	17,569,100	4,749,019	.....
Nevada	1,035,151	956,200	.....	78,951
New Mexico	632,183	694,800	62,617	.....
North Carolina	352	400	48	.....
Oregon	26,171	51,000	24,829	.....
South Carolina	305	400	95	.....

TABLE SHOWING THE PRODUCT OF SILVER IN THE SEVERAL STATES AND TERRITORIES IN 1894 AND 1895 AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR—Continued.

State or Territory.	1894.	1895.	Increase.	Decrease.
	Ounces, fine.	*Ounces, fine.*	*Ounces, fine.*	*Ounces, fine.*
South Dakota	58,973	159,300	100,327	.....
Texas	429,314	450,000	20,686	.....
Utah	5,891,901	7,468,100	1,576,199	.....
Washington	113,160	122,700	9,540	.....
Alabama, Connecticut, Maryland, Minnesota, Nebraska, Tennessee, Virginia, Vermont, Wyoming	182	400	218	.....
Total	49,500,000	55,727,060	6,707,871	480,871
Net increase	.....	.....	6,227,000	.....

PRODUCT OF GOLD AND SILVER REPORTED BY MINT OFFICERS AND AGENTS FOR THE INDIVIDUAL STATES AND TERRITORIES FOR THE CALENDAR YEAR 1895.

State or Territory.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Alabama	224	$4,635	56	$73	$4,708
Alaska	112,637	2,328,419	75,691	97,863	2,426,282
Arizona	90,540	1,871,618	905,071	1,170,193	3,041,811
California	741,798	15,334,317	463,900	599,790	15,934,107
Colorado	726,275	15,013,434	24,034,813	31,075,314	46,088,748
Georgia	6,189	127,942	357	462	128,404
Idaho	125,517	2,594,666	4,033,180	5,214,498	7,809,164
Maryland	24	499	2	2	501
Michigan	2,076	42,915	37,298	48,224	91,139
Montana	209,321	4,327,040	17,701,658	22,886,992	27,214,032
Nevada	86,117	1,780,204	813,650	1,051,992	2,832,196
New Mexico	45,620	943,050	354,134	457,870	1,400,920
North Carolina	3,313	68,476	557	720	69,196
Oregon	88,898	1,837,682	11,750	15,192	1,852,874
South Carolina	6,183	127,819	373	483	128,302
South Dakota	206,411	4,266,898	105,917	136,943	4,403,841
Tennessee	16	334	1	1	335
Texas	17	351	450,064	581,901	582,252
Utah	74,820	1,546,679	8,141,383	10,525,994	12,072,673
Virginia	305	6,303	17	22	6,325
Washington	18,051	373,148	109,060	141,007	514,155
Total	2,544,352	52,596,429	57,238,932	74,005,536	126,601,965

APPROXIMATE DISTRIBUTION BY PRODUCING STATES AND TERRITORIES OF THE PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FOR THE CALENDAR YEAR 1895 AS ESTIMATED BY THE DIRECTOR OF THE MINT.

State or Territory.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Alaska	78,140	$1,615,300	67,200	$86,880	$1,702,180
Arizona	95,072	1,965,300	986,000	1,275,990	3,241,290
California	722,171	14,928,600	653,700	845,180	15,773,780
Colorado	643,634	13,305,100	23,398,500	30,252,600	43,557,700
Georgia	6,192	128,000	400	520	128,520
Idaho	86,088	1,779,600	3,110,600	4,021,780	5,801,380
Michigan	2,075	42,900	37,300	48,220	91,120
Montana	198,405	4,101,400	17,569,100	22,715,600	26,817,000
Nevada	75,088	1,552,200	956,200	1,236,290	2,788,490
New Mexico	23,810	492,200	694,800	898,320	1,390,520
North Carolina	2,622	54,200	400	520	54,720
Oregon	42,972	888,300	51,000	65,930	954,230
South Carolina	6,212	128,400	400	520	128,920
South Dakota	187,187	3,869,500	159,300	205,960	4,075,460
Texas	.....	.....	450,000	581,810	581,810
Utah	66,419	1,373,000	7,468,100	9,655,720	11,028,720
Washington	16,980	351,000	122,700	158,640	509,640
Alabama					
Connecticut					
Minnesota					
Nebraska	1,693	35,000	400	520	35,520
Tennessee					
Virginia					
Wyoming					
Total	2,254,760	46,610,000	55,727,000	72,051,000	118,661,000

The following table shows the production of gold and silver from the mines of the United States in the years 1860 to 1895.

(The silver product is given at its commercial value, reckoned at the average market price of silver each year, as well as its coining value in United States dollars.)

PRODUCT OF GOLD AND SILVER FROM MINES IN THE UNITED STATES, 1860–1895.

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1860	2,225,250	$46,000,000	116,015	$157,000	$150,000
1861	2,080,125	43,000,000	1,546,875	2,062,000	2,000,000
1862	1,896,300	39,200,000	3,480,469	4,685,000	4,500,000
1863	1,935,000	40,000,000	6,574,219	8,842,000	8,500,000
1864	2,230,088	46,100,000	8,507,812	11,443,000	11,000,000
1865	2,574,759	53,225,000	8,701,171	11,642,000	11,250,000
1866	2,588,063	53,500,000	7,734,375	10,356,000	10,000,000
1867	2,502,197	51,725,000	10,441,406	13,866,000	13,500,000
1868	2,322,000	48,000,000	9,281,250	12,307,000	12,000,000
1869	2,394,563	49,500,000	9,281,250	12,298,000	12,000,000
1870	2,418,750	50,000,000	12,375,000	16,734,000	16,000,000
1871	2,104,313	43,500,000	17,789,062	23,578,000	23,000,000
1872	1,741,500	36,000,000	22,236,328	29,396,000	28,750,000
Total	29,012,908	590,750,000	118,065,232	157,366,000	152,050,000

PRODUCT OF GOLD AND SILVER FROM MINES IN THE UNITED STATES, 1860–1895—Continued.

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1873	1,741,500	$36,000,000	27,650,000	$35,890,000	$35,750,000
1874	1,620,563	33,500,000	28,849,000	36,869,000	37,300,000
1875	1,615,725	33,400,000	24,518,000	30,549,000	31,700,000
1876	1,930,162	39,900,000	30,009,000	34,690,000	38,800,000
1877	2,268,788	46,900,000	30,783,000	36,970,000	39,800,000
1878	2,476,800	51,200,000	34,960,000	40,270,000	45,200,000
1879	1,881,787	38,900,000	31,550,000	35,430,000	40,800,000
1880	1,741,500	36,000,000	30,320,000	34,720,000	39,200,000
1881	1,678,612	34,700,000	33,260,000	37,850,000	43,000,000
1882	1,572,187	32,500,000	36,200,000	41,120,000	46,800,000
1883	1,451,250	20,000,000	35,730,000	39,660,000	46,200,000
1884	1,489,950	30,800,000	37,800,000	42,070,000	48,800,000
1885	1,538,325	31,800,000	39,910,000	42,500,000	51,600,000
1886	1,693,125	35,000,000	39,440,000	39,230,000	51,000,000
1887	1,596,375	33,000,000	41,200,000	40,410,000	53,350,000
1888	1,604,841	33,175,000	45,780,000	43,020,000	59,195,000
1889	1,587,000	32,800,000	50,000,000	46,750,000	64,646,000
1890	1,588,880	32,845,000	54,500,000	57,225,000	70,465,000
1891	1,604,840	33,175,000	58,330,000	57,630,000	75,417,000
1892	1,596,375	33,000,000	63,500,000	55,563,000	82,101,000
1893	1,739,323	35,955,000	60,000,000	46,800,000	77,576,000
1894	1,910,813	39,500,000	49,500,000	31,422,000	64,000,000
1895	2,254,760	46,610,000	55,727,000	36,445,000	72,051,000
Total	40,183,481	830,660,000	939,576,000	943,083,000	1,214,751,000
Grand total	69,196,389	1,430,410,000	1,057,641,232	1,100,449,000	1,367,401,000

TABLE SHOWING THE WEIGHT OF THE DEPOSITS AND REDEPOSITS OF GOLD BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1894 AND 1895, AND THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of gold bullion.	Calendar year.		Increase 1895.	Decrease 1895.	Net increase 1895.
	1894.	1895.			
	Fine ounces.	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*
Domestic bullion, crude	703,739	782,587	78,848	.....	.....
Domestic bullion, refined	1,279,597	1,619,992	340,395	.....	.....
Domestic coin, transferred from the Treasury	28,844	10,579	.....	18,265	.....
Domestic coin, mutilated and abraded	32,941	42,580	9,639	.....	.....
Foreign bullion, crude	112,698	123,546	10,848	.....	.....
Foreign bullion, refined	11,791	557,482	545,691	.....	.....
Foreign coin, melted	86,765	56,728	.....	30,037	.....
Jewelers' bars, old plate, etc.	148,099	165,355	17,256	.....	.....
Total deposits	2,404,474	3,358,849	1,002,677	48,302	954,375
Redeposits:					
Fine bars	1,977,917	1,096,783	.....	881,134	.....
Unparted bars	439,165	432,702	.....	6,463	.....
Total gold received	4,821,556	4,888,334	1,002,677	935,899	66,778

TABLE SHOWING THE VALUE OF THE DEPOSITS AND REDEPOSITS OF GOLD BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1894 AND 1895, AND THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of gold bullion.	Calendar year.		Increase 1895.	Decrease 1895.	Net increase 1895.
	1894.	1895.			
Domestic bullion, crude	$14,547,573	$16,177,509	$1,629,936		
Domestic bullion, refined	24,451,628	33,488,204	7,036,576		
Domestic coin, transferred from the Treasury	596,260	218,697		$377,563	
Domestic coin, mutilated and abraded	680,952	880,204	199,252		
Foreign bullion, crude	2,329,671	2,553,930	224,259		
Foreign bullion, refined	243,753	11,524,169	11,280,416		
Foreign coin, melted	1,793,592	1,172,663		620,929	
Jewelers' bars, old plate, etc	3,061,472	3,418,203	356,731		
Total deposits	49,704,901	69,433,579	20,727,170	998,492	$19,728,678
Redeposits:					
Fine bars	40,887,181	22,672,519		18,214,662	
Unparted bars	9,078,341	8,944,765		133,576	
Total gold received	99,670,423	101,050,863	20,727,170	19,346,730	1,380,440

TABLE SHOWING THE WEIGHT OF THE DEPOSITS AND REDEPOSITS OF SILVER BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1894 AND 1895, AND THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of silver bullion.	Calendar year.		Increase 1895.	Decrease 1895.	Net decrease 1895.
	1894.	1895.			
	Fine ounces.	*Fine ounces.*	*Fine ounces.*	*Fine ounces.*	*Fine ounces*
Domestic bullion, crude	1,241,110	556,368		684,742	
Domestic bullion, refined	4,114,410	5,817,212	1,702,802		
Domestic coin, transferred from Treasury	4,036,584	2,701,051		1,335,533	
Domestic coin, worn and uncurrent	6,387	3,620		2,767	
Trade dollars, uncurrent, deposited	251	329	78		
Foreign bullion, a crude	1,007,747	968,095		39,652	
Foreign coin, melted	16,688	56,822	40,134		
Jewelers' bars, old plate, etc	498,228	603,690	105,462		
Total deposits	10,921,405	10,707,187	1,848,476	2,062,694	214,218
Redeposits:					
Fine bars	93,537	67,717		25,820	
Unparted bars	80,644	259,094	178,450		
Total silver received	11,095,586	11,033,998	2,026,926	2,088,514	61,588

a No deposits of refined foreign bullion.

TABLE SHOWING THE VALUE OF THE DEPOSITS AND REDEPOSITS OF SILVER BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1894 AND 1895, AND THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of silver bullion.	Calendar year.		Increase 1895.	Decrease 1895.	Net decrease 1895.
	1894.	1895.			
Domestic bullion, crude	$1,604.068	$719,345	.....	$885,323	.....
Domestic bullion, refined	5,319,641	7,521,244	$2,201,603	.....	.....
Domestic coin, transferred from Treasury	5,219,018	3,492,268	.....	1,726,750	.....
Domestic coin, worn and uncurrent	5,259	4,681	.....	3,578	.....
Trade dollars, uncurrent	324	425	101	.....	.....
Foreign bullion, *a* crude	1,302,945	1,251,678	.....	51,267	.....
Foreign coin, melted	21,576	73,467	51,891	.....	.....
Jewelers' bars, old plate, etc.	644,174	780,528	136,354	.....	.....
Total deposits	14,120,605	13,843,636	2,389,949	2,666,918	$276,969
Redeposits:					
Fine bars	120,937	87,554	.....	33,383	.....
Unparted bars	104,266	334,990	230,724	.....	.....
Total silver received	14,345,808	14,266,180	2,620,673	2,700,301	79,628

a No deposits of refined foreign bullion.

GOLD AND SILVER (NOT INCLUDING REDEPOSITS) RECEIVED AT THE MINTS AND ASSAY OFFICES DURING THE CALENDAR YEARS 1880–1895.

Calendar year.	Gold.	Silver (coining value).	Total.
1880	$100,278,703	$35,103,825	$135,382.528
1881	98,763,426	30,326,848	129,090,274
1882	41,921,263	35,161,254	77,082,517
1883	51,089,456	36,978,184	88,067,640
1884	50,518,179	36,670,731	87,188,910
1885	44,714,052	35,836,725	80,550,777
1886	66,422,088	39,086,070	105,508,158
1887	74,724,077	46,381,333	121,105,410
1888	41,496,410	41,323,973	82,820,383
1889	42,599,206	41,977,265	84,576,471
1890	48,767,964	55,198,037	103,966,001
1891	60,849,552	70,994,120	131,843,672
1892	45,406,646	84,591,898	129,998,544
1893	69,419,223	62,465,005	131,884,228
1894	49,704,902	14,120,605	63,825,507
1895	69,433,579	13,843,636	83,277,215

COINAGE EXECUTED IN THE UNITED STATES, CALENDAR YEAR 1895.

Description.	Pieces.	Value.
Gold	4,437,037	$59,616,357.50
Silver dollars	862,880	862,880.00
Subsidiary silver coin	15,981,745	4,835,130.25
Minor coin	48,323,520	882,430.56
Total	69,605,182	66,196,798.31

BARS MANUFACTURED, CALENDAR YEAR 1895.

Description.	Gold.	Silver.
Fine bars	$36,813,413.94	$8,936,608.92
Mint bars	3,018,543.39	80,829.39
Standard bars	269,594.96	.....
Unparted bars	7,953,658.85	470,045.66
Total	48,055,211.14	9,487,483.97

PURCHASE OF SILVER.

Since November 1, 1893, the date of the repeal of the purchasing clause of the act of July 14, 1890, the purchase of silver bullion by the Government has consisted of the silver contained in gold deposits, the small fractions of silver for return in fine bars, the amount retained in payment of charges, surplus silver bullion returned by the operative officers of the mints at the annual settlement, and mutilated domestic silver coin purchased for the subsidiary silver coinage under the provisions of section 3526 of the Revised Statutes.

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER ACT OF FEBRUARY 28, 1878.

Fiscal year.	Ounces, fine.	Cost.	Average price per ounce, fine.	Bullion value of a silver dollar.
1878	10,809,350 58	$13,023,268.96	$1.2048	$0.9318
1879	19,248,086.09	21,593,642.99	1.1218	.8676
1880	22,057,862.64	25,235,081.53	1.1440	.8848
1881	19,709,227.11	22,327,874.75	1.1328	.8761
1882	21,190,200.87	24,054,480.47	1.1351	.8779
1883	22,889,241.24	25,577,327.58	1.1174	.8642
1884	21,922,951.52	24,378,383.91	1.1120	.8600
1885	21,791,171.61	23,747,460.25	1.0897	.8428
1886	22,690,652 94	23,448,960.01	1.0334	.7992
1887	26,490,008.04	25,968,620.46	.9810	.7587
1888	25,386,125.32	24,237,553.20	.9547	.7384
1889	26,468,861.03	24,717,853.81	.9338	.7222
1890	27,820,900.05	26,899,326.33	.9668	.7477
1891	2,797,379 52	3,049,426.46	1.0901	.8431
Total	291,272,018.56	308,279,260.71	1.0583	.8185

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER ACT OF JULY 14, 1890.

Fiscal year.	Ounces, fine.	Cost.	Average price per ounce, fine.	Bullion value of a silver dollar
1891	48,393,113.05	$50,577,498.44	$1.0451	$0.8063
1892	54,355,748.10	51,106,607.96	.9402	.7271
1893	54,008,162.60	45,531,374.53	.8430	.6520
1894	11,917,658.78	8,715,521.32	.7313	.5656
Total	168,674,682.53	155,931,002.25	.9244	.7150

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER ACTS OF FEBRUARY 28, 1878, AND JULY 14, 1890.

RECAPITULATION.

Act.	Ounces, fine.	Cost.	Average price per ounce, fine.	Bullion value of a silver dollar.
Act 1878	291,272,018.56	$308,279,260.71	$1.0583	$0.8185
Act 1890	168,674,682.53	155,931,002.25	.9244	.7150
Total	459,946,701.09	464,210,262.96	1.0093	.7806

TABLE SHOWING THE WEIGHT, COST, AND AVERAGE PRICE, PER FINE OUNCE, OF THE SILVER PURCHASED BY THE UNITED STATES UNDER ACTS OF FEBRUARY 12, 1873; JANUARY 14, 1875; FEBRUARY 28, 1878, AND JULY 14, 1890.

Act authorizing.	Ounces, fine.	Cost.	Average cost per ounce.
February 12, 1873	5,434,282	$7,152,564	$1.314
January 14, 1875	31,603,906	37,571,148	1.189
February 28, 1878	291,272,019	308,279,261	1.058
July 14, 1890	168,674,682	155,931,002	.924
Total	496,984,889	508,933,975	1.024

BALANCE OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, ON HAND AT EACH MINT JANUARY 1, 1896.

Mints.	Fine ounces.	Cost.
Philadelphia	118,896,659.69	$107,616,313.80
San Francisco	10,864,010.50	9,728,606.06
New Orleans	7,304,219.26	6,271,930.00
Carson	574,409.91	459,857.39
Total	137,639,299.36	124,076,707.25

TABLE SHOWING QUANTITY OF SILVER PURCHASED, AND COST OF THE SAME, FOR SUBSIDIARY COINAGE DURING THE CALENDAR YEAR 1895.

Stock.	Ounces, fine.	Cost.
Partings, charges, and fractions purchased	226,815.67	$150,095.34
Mutilated coins, including melted assay coins, purchased	2,018.59	1,573.31
Surplus bullion purchased	7,517.31	4,726.31
Total	236,351.57	156,394.96

TABLE SHOWING THE QUANTITY AND COST OF SILVER PURCHASED AT EACH MINT FOR THE SUBSIDIARY COINAGE DURING THE CALENDAR YEAR 1895.

Mint.	Ounces, fine.	Cost.
Philadelphia	178,245.02	$119,379.97
San Francisco	50,102.26	31,979.60
New Orleans	3,497.60	2,233.91
Carson	4,506.69	2,801.48
Total	236 351.57	156,394.96

IMPORTS AND EXPORTS OF THE PRECIOUS METALS.

GOLD.—The value of foreign gold bullion imported into the United States during the calendar year 1895 was $12,799,434. Of this amount $6,719,009 came from England, $2,435,296 from Mexico, $1,696,042 from France, $987,939 from Germany, $290,433 from Colombia, $287,587 from British Columbia, $178,136 from Nicaragua, $106,207 from Quebec, Ontario, and Nova Scotia, and the remainder from South and Central America.

The value of the foreign gold coins imported was $10,759,957. Of this amount $6,797,526 came from France, $1,476,317 from Cuba, $1,163,624 from England, $486,650 from Australasia, $272,107 from Canada, $129,639 from the West Indies, and the remainder principally from South and Central America.

The invoiced value of foreign gold ores for reduction was $46,713, nearly all of which came from Mexico and England.

The value of gold contained in imported base bullion and silver ore was $1,824,346. Of this amount $963,873 came from Mexico and the remainder ($860,473) from British Columbia.

The value of the United States gold coins imported during the year was $8,939,064. Of this amount $5,450,803 came from England, $2,289,122 from Quebec and Ontario, $440,747 from Venezuela, $375,075 from the West Indies, $207,947 from Mexico, and the remainder from the Hawaiian Islands and South and Central America.

The following table shows the total gold imports for the calendar year 1895:

GOLD IMPORTS, 1895.

Items.	Amount.
Foreign bullion	$12,799,434
Foreign coin	10,759,957
Foreign ores	46,713
In foreign base bullion	472,417
In foreign silver ore	1,351,929
Total foreign	25,430,450
United States gold coin	8,939,064
Total imports	34,369,514

The value of domestic gold bullion—bars bearing the stamp of a United States mint or assay office—exported during the calendar year 1895 was $17,147,168. Of this amount $12,729,985 went to England, $3,818,183 to Germany, $591,400 to France, and $7,600 to Quebec. Other domestic gold bullion of the value of $518,332 was exported, of which $427,252 went to England, $78,054 to Quebec, and the remainder to Germany, Italy, and Hongkong.

The value of United States gold coins exported was $76,072,515. Of this amount $46,370,000 went to England, $11,325,000 to France, $9,266,000 to Germany, $4,224,014 to Quebec, $1,700,000 to Argentina, $1,109,866 to Venezuela, $1,068,631 to the West Indies, $470,000 to the Hawaiian Islands, $250,000 to Belgium, $116,840 to Hongkong, $100,000 to Newfoundland, and the remainder to South and Central America.

The value of foreign gold coins reexported was $11,176,960, of which $9,306,169 went to Cuba, $1,672,073 to France, and $161,577 to England.

The value of gold contained in base bullion, silver ore, and copper matte exported during 1895 was $52,423, all of which went to England and Germany.

The following table shows the total gold exports for the calendar year 1895:

GOLD EXPORTS, 1895.

Items.	Amount.
United States bars	$17,147,168
Other domestic bullion	518,332
United States coin	76,072,515
In base bullion	2,710
In silver ore	956
In copper matte ($48,757, custom-house record for a part of the year only)	102,202
Total domestic	93,843,883
Foreign coin reexported	11,176,960
Total gold exports	105,020,843

In the above table the item "in copper matte, $102,202," ascertained by the Bureau of the Mint from the superintendent of the United States assay office at New York and the collector of customs at Baltimore (see the correspondence below), has been substituted for the amount of gold exported in the form of copper matte, viz, $48,757, contained in the custom-house record, the latter being for part of the year only.

SILVER.—The value of the foreign silver bullion imported during the year was $3,477,859; of this amount $3,213,644 came from Mexico, $167,181 from Honduras, $80,744 from Colombia, and the remainder from British Columbia and South America.

The invoiced value of the silver ore imported was $164,850, nearly all of which came from Peru. There was also imported silver in base bullion and ore of the invoiced value of $13,701,753; of this amount $12,717,597 came from Mexico and the remainder from British Columbia.

These silver-lead ores contained 92,649,678 pounds of lead, valued at $1,142,059, and 6,074,506 pounds of copper, valued at $387,147.

The quantity and value of the metals contained in these ores is shown in the following table:

IMPORTS OF BASE BULLION, BASE SILVER ORE, AND COPPER BULLION INTO THE UNITED STATES DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895, AND THEIR METALLIC CONTENTS.

Customs districts and ports.	Weight and value of base bullion, silver ore, and copper bullion imported.							
	Base bullion.		Silver, lead, copper, and base ore.		Copper bullion.		Total base bullion.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
From Mexico:								
Pittsburg	14,973,177	$1,403,764	.....	.....	.....	.....	14,973,177	$1,403,764
Saluria	7,171,834	461,874	1,950,347	$106,021	.....	.....	9,122,181	567,895
Arizona	.....	.....	16,140,947	1,276,171	766,370	$35,696	16,907,317	1,311,867
Perth Amboy	24,665,443	2,287,683	.....	.....	.....	.....	24,665,443	2,287,683
Paso del Norte	271,809	3,317	184,406,130	3,435,326	.....	.....	184,677,939	3,438,643
San Francisco	.....	.....	9,214,611	767,343	.....	.....	9,214,611	767,343
Galveston	238,587	18,261	.....	.....	.....	.....	238,587	18,261
Corpus Christi	2,551,204	256,670	249,616	21,625	.....	.....	2,800,820	278,295
New York	(a)	4,712,487	(a)	(a)	.....	.....	(a)	4,712,487
Total from Mexico	49,872,054	9,144,056	211,961,651	5,606,486	766,370	35,696	262,600,075	14,786,238
From British Columbia:								
Minnesota	2,781,405	151,753	.....	.....	.....	.....	2,781,405	151,753
Omaha	.....	.....	12,305,092	604,887	.....	.....	12,305,092	604,887
Puget Sound	2,167,619	112,810	50,146,448	1,351,912	.....	.....	52,314,067	1,464,722
Montana and Idaho	.....	.....	825,696	47,705	.....	.....	825,696	47,705
Total from British Columbia	4,949,024	264,563	63,277,236	2,004,504	.....	.....	68,226,260	2,269,067
Total imports	54,821,078	9,408,619	275,238,887	7,610,990	766,370	35,696	330,826,335	17,055,305

Customs districts and ports.	Metallic contents of the importation.							
	Gold.		Silver.		Lead.		Copper.	
	Ounces.	Value.	Ounces.	Value.	Pounds.	Value.	Pounds.	Value.
From Mexico:								
Pittsburg	.....	.....	1,930,056	$1,272,854	14,829,773	$130,910	.....	.....
Saluria	2,560	$51,351	859,536	461,633	6,947,348	54,430	11,806	$481
Arizona	1,175,031	235,036	1,615,561	990,951	2,092,066	89,817	921,226	46,063
Perth Amboy	885	18,291	2,894,326	1,969,709	23,629,242	238,467	848,044	61,216
Paso del Norte	14,967	318,856	4,570,943	2,784,185	29,244,874	326,695	174,418	8,907
San Francisco	8,333	172,394	976,223	574,097	861,103	20,852	.....	.....
Galveston	.....	.....	38,885	11,647	220,397	5,287	16,750	1,327
Corpus Christi	602	13,146	143,471	94,833	382,152	11,876	2,154,553	158,440
New York	7,740	154,799	6,702,519	4,557,688	(a)	(a)	(a)	(a)
Total from Mexico	1,210,118	963,873	19,631,520	12,717,597	78,206,955	828,334	4,126,802	276,434

a No information furnished.

IMPORTS OF BASE BULLION, BASE SILVER ORE, AND COPPER BULLION INTO THE UNITED STATES DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895, AND THEIR METALLIC CONTENTS—Continued.

Customs districts and ports.	Metallic contents of the importation.							
	Gold.		Silver.		Lead.		Copper.	
	Ounces.	Value.	Ounces.	Value.	Pounds.	Value.	Pounds.	Value.
From British Columbia:								
Minnesota	6	$109	98,941	$65,984	2,773,159	$85,660	.....	.....
Omaha	.....	.....	791,558	495,980	5,405,505	108,907	.....	.....
Puget Sound	43,020	860,364	589,216	384,656	5,935,034	110,386	1,931,351	$109,316
Montana and Idaho	.....	.....	59,047	37,536	329,025	8,772	16,353	1,397
Total from British Columbia	43,026	860,473	1,538,762	984,156	14,442,723	313,725	1,947,704	110,713
Total imports	1,253,144	1,824,346	21,170,282	13,701,753	92,649,678	1,142,059	6,074,506	387,147

RECAPITULATION OF IMPORTS OF BASE BULLION, 1895.

Description.	From Mexico.		From British Columbia.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Base bullion	49,872,054	$9,144,056	4,949,024	$264,563	54,821,078	$9,408,619
Base silver ore	211,961,651	5,606,486	63,277,236	2,004,504	275,238,887	7,610,990
Copper bullion	766,370	35,696	.....	.....	766,370	35,696
Total	262,600,075	14,786,238	68,226,260	2,269,067	330,826,335	17,055,305

METALLIC CONTENTS OF IMPORTATION OF BASE BULLION, 1895.

Description.	From Mexico.		From British Columbia.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold (ounces)	1,210,118	$963,873	43,026	$860,473	1,253,144	$1,824,346
Silver (ounces)	19,631,520	12,717,597	1,538,762	984,156	21,170,282	13,701,753
Lead (pounds)	78,206,955	828,334	14,442,723	313,725	92,649,678	1,142,059
Copper (pounds)	4,126,802	276,434	1,947,704	110,713	6,074,506	387,147
Total	.....	14,786,238	.....	2,269,067	.....	17,055,305

The value of the foreign silver coins imported was $7,528,191; of this amount $6,287,879 came from Mexico, $409,293 from Colombia, $320,088 from the West Indies, $272,929 from British Honduras, and the remainder from South and Central America.

Our own silver coins (subsidiary pieces) of the value of $104,070 were imported; of this amount $27,000 came from Salvador, $17,514 from England, $13,362 from the West Indies, and the remainder from various countries.

The following table shows the total silver imports for the year:

SILVER IMPORTS, 1895.

Items.	Amount.
Foreign bullion (commercial value)	$3,477,859
Foreign coin	7,528,191
Foreign ores (commercial value)	164,850
In foreign base bullion (commercial value)	8,407,346
In foreign silver ore (commercial value)	5,294,407
Total foreign	24,872,653
United States silver coin	104,070
Total silver imports	24,976,723

There were exported 23,035 ounces of domestic silver bullion, valued at $16,024, bearing the stamp of a United States mint or assay office, all of which went to England and Canada. Other silver bullion, containing 70,248,067 ounces, valued at $46,229,953, was exported, of which 55,658,344 ounces, of the value of $36,875,706, went to England; 6,469,271 ounces, of the value of $4,076,600, to China; 3,829,910 ounces, of the value of $2,439,541, to Japan; 1,925,400 ounces, of the value of $1,259,050, to Hongkong; 1,255,894 ounces, of the value of $836,615, to Guatemala; 607,182 ounces, of the value of $410,700, to France; 271,309 ounces, of the value of $181,002, to Colombia; 149,800 ounces, of the value of $100,600, to British East India, and the remainder to Canada and Germany.

Our own subsidiary silver coins, of the value of $351,042, were exported. Of this amount $252,292 went to the Dominion of Canada and $98,000 to Ecuador.

The value of silver exported in base bullion, ore, and copper matte was $378,352, nearly all of which was shipped to England in copper matte.

The value of foreign silver bullion reexported was $217,547, of which $202,600 went to Mexico and the remainder to England. Foreign silver coins of the value of $7,020,894 were reexported. Of this amount $4,024,872 went to Hongkong, $805,008 to England, $769,600 to China, $304,637 to Mexico, $270,749 to Japan, $263,891 to Colombia, $218,603 to the West Indies, $147,000 to Ecuador, $112,648 to the Dominion of Canada, and the remainder to South and Central America.

The correspondence relating to the amounts of gold and silver exported in copper matte referred to above is as follows:

OFFICE OF THE COLLECTOR OF CUSTOMS,
Port of Baltimore, Md., March 21, 1896.

SIR: In reply to your letter of the 19th instant, I have the honor to inclose herewith a statement of the amount of gold and silver contained in "copper matte" exported from this port during the calendar year 1895.

The records of this office do not indicate that there were any silver ores, pig copper, or argentiferous matte exported during the above-mentioned period.

Respectfully, yours,

FRANK T. SHAW, *Collector.*

Hon. R. E. PRESTON,
Director of the Mint, Washington, D. C.

ABSTRACT OF SILVER-COPPER MATTE EXPORTED FROM THE PORT OF BALTIMORE, MD., DURING THE CALENDAR YEAR 1895, CALCULATED ON A BASIS OF 60.5 PER CENT PURE COPPER, 35 OUNCES PURE SILVER, AND 0.14 OUNCES PURE GOLD.

Months.	Matte.		Pure copper.	Pure silver.	Pure gold.
	Pounds.	*Tons.*	*Pounds.*	*Ounces.*	*Ounces.*
June	3,360,905	1,500	2,033,348	52,514	210.06
December	915,264	408.6	553,735	14,301	57.204
Total	4,276,169	1,908.6	2,587,083	66,815	267.264

OFFICE OF THE COLLECTOR OF CUSTOMS,
Port of New York, March 25, 1896.

SIR: In reply to your letter of the 19th instant asking for a statement of the amount of gold and silver contained in silver ores, copper matte, pig copper, and argentiferous matte exported from the port of New York during the calendar year 1895, permit me to state that no record of gold and silver contained in these articles was kept at this office prior to August, 1895. The gold and silver contained in ores, matte, etc., exported from August 1 to December 31, 1895, were as follows:

1895.	Silver.		Gold.	
	Ounces.	Value.	Ounces.	Value.
August	36,408	$25,778	157	$3,240
September	59,388	38,065	290	5,884
October	152,485	99,840	705	13,810
November	110,212	72,295	737	14,760
December	153,576	96,231	305	6,092

Very respectfully,

JAMES F. KILBRETH, *Collector.*

DIRECTOR OF THE MINT,
Washington, D. C.

THE UNITED STATES ASSAY OFFICE AT NEW YORK,
SUPERINTENDENT'S OFFICE,
May 13, 1896.

SIR: In response to your letter of March 19, I have to report that there was 18,788 long tons of copper matte and pig copper, containing 4,677 ounces of pure gold and 1,546,900 ounces of pure silver, exported from the port of New York during the calender year 1895.

Respectfully, yours,

J. W. CORSA,
Acting Superintendent.

R. E. PRESTON,
Director of the Mint, Washington, D. C.

The following table shows the total silver exports for the year:

SILVER EXPORTS, 1895.

Items.		Amount.
United States bars		$16,024
Other bullion		46,229,953
United States subsidiary coin		351,042
In base bullion		940
In silver ore		419
In copper matte ($376,993, custom-house record for a part of the year only)		1,055,370
Total domestic		47,653,748
Foreign silver coin reexported	$7,020,894	
Foreign silver bullion reexported	217,547	
Total foreign		7,238,441
Total silver exports		54,892,189

In the above table the item "in copper matte, $1,055,370," ascertained by the Bureau of the Mint from the superintendent of the United States assay office at New York and the collector of customs at Baltimore (see the correspondence above), has been substituted for the amount of silver exported in the form of copper matte contained in the custom-house record, viz, $376,993, the latter being for part of the year only.

In the Appendix (p. 330) will be found tables exhibiting the imports and exports of the precious metals, by customs districts and by counties, for the calendar year 1895.

MOVEMENT OF GOLD FROM THE UNITED STATES.

The superintendent of the United States assay office at New York has kindly prepared the following tables, giving the exports and imports of gold through the port of New York during the calendar year 1895:

STATEMENT OF UNITED STATES GOLD COIN EXPORTED FROM THE PORT OF NEW YORK TO EUROPE DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

Date.	Destination.	Value.	Rate of exchange.	Date.	Destination.	Value.	Rate of exchange.
January 3	Germany	$2,209,282	$4.88⅛	March 30	Germany	$1,360	$4.89⅛
January 4	France	2,244,000	4.88⅛	May 4	do	460	4.89
January 11	do	2,060,000	4.88⅛	June 8	England	1,179	4.89⅛
January 15	England	850,000	4.88⅛	June 15	do	11,089	4.89⅛
January 18	do	850,000	4.89	June 21	do	800	4.89⅛
	France	3,519,000	4.89	July 8	do	50,000	4.90
January 22	England	250,000	4.89	July 12	Germany	5,000	4.90
January 23	Germany	250,000	4.89		England	200,000	4.90⅛
January 25	France	3,039,000	4.89⅛	July 16	do	70,000	4.90
	England	3,650,000	4.89⅛	July 17	do	80,000	4.90
January 28	Germany	3,500,000	4.89⅛	July 18	do	1,060,000	4.90
January 29	England	2,350,000	4.89⅛	July 19	Germany	12,000	4.90
February 1	Germany	65,000	4.89⅛	July 23	England	39,000	4.90
	France	1,054,400	4.89⅛		do	85,000	4.90

STATEMENT OF UNITED STATES GOLD COIN EXPORTED, ETC.—Continued.

Date.	Destination.	Value.	Rate of exchange.	Date.	Destination.	Value.	Rate of exchange.
July 24	England	$130,000	$4.90	September 9	England	$1,200,000	$4.90
July 26	do	35,000	4.90	September 10	do	345,000	4.90
	Germany	8,000	4.90	September 11	do	1,100,000	4.90
August 2	England	1,422,000	4.90⅛	September 13	Germany	8,000	4.90
August 5	do	156,000	4.90⅛		England	4,571,421	4.90
August 6	do	350,000	4.90⅛	September 16	do	1,000,000	4.89½
August 7	do	1,170,200	4.90⅛	September 17	do	350,000	4.89½
August 9	do	367,900	4.90⅛	September 18	do	250,000	4.89½
August 12	do	1,650,000	4.90⅛		Germany	6,000	4.89½
August 13	do	900,000	4.90⅛	September 20	England	150,000	4.89½
August 14	do	1,327,000	4.90⅛	September 25	Germany	1,000,000	4.89
August 16	do	415,000	4.90⅛	September 27	do	1,506,000	4.88½
	Germany	5,000	4.90⅛	October 19	do	4,000	4.88½
August 19	England	150.200	4.90⅛	November 11	England	1,000,000	4.89½
August 20	do	2,850,000	4.90⅛	November 15	do	2,250,000	4.89½
August 21	do	100,000	4.90	November 19	do	1,750,000	4.89½
August 23	do	1,098,500	4.90	November 20	do	1,000,000	4.89½
	Germany	8,000	4.90	November 22	do	4,663,751	4.89½
August 26	England	600,000	4.89⅛	November 29	do	2,989,728	4.89
August 27	do	50,000	4.89⅛	December 7	do	2,424,522	4.89
August 28	do	250,000	4.89⅛	December 14	Germany	1,010,000	4.88½
August 30	do	2,400,200	4.90	December 16	do	1,183,000	4.88½
	Germany	5,000	4.90	December 21	do	2,538,437	4.89½
September 3	England	1,150,200	4.90		England	2,619,455	4.89½
September 4	do	1,700,000	4.90	December 28	do	2,270,479	4.89½
September 6	do	1,754,314	4.90	Total		84,806,877	
	France	58,000	4.90				

RECAPITULATION OF GOLD EXPORTS TO EUROPE.

Classification of exports.	England.	Germany.	France.
United States coin	$46,386,000	$8,717,000	$11,383,000
Gold bars (New York assay office)	a 12,601,425	4,329,378	
Foreign coin	277,977	754	1,884,315
Bullion (unknown)	520,513	278,161	591,400
Total shipments to Europe	59,785,915	13,325,293	13,858,715
Grand total shipments to Europe			86,969,923

a Gold bars to the amount of $474,086.63 exchanged for gold coin in December, 1895, which was not shipped until January, 1896, is not included in the above statement, but will appear as an export for the year 1896.

During the same period there were shipped to the West Indies and Central and South America the following amounts:

Exports.	Value.
United States gold coin	$3,882,519
Foreign coin	8,965,932
Gold bullion	5,400
Total	12,853,851
Grand total of exports	99,823,774

The imports of gold during the same period were as follows:

Imports.	Value.
From Europe:	
United States gold coin	$5,450,813
Foreign coin	7,955,717
Gold bullion	9,451,655
Total	22,858,185
From Mexico, Central and South America, and West Indies:	
United States gold coin	935,967
Foreign coin	1,685,397
Gold bullion	428,844
Total	3,050,208
Grand total of imports	25,908,393

The superintendent of the United States mint at San Francisco has prepared the following table giving the imports and exports of gold and silver through the port of San Francisco during the calendar year 1895.

IMPORTS AND EXPORTS OF GOLD AND SILVER AT SAN FRANCISCO DURING THE CALENDAR YEAR ENDING DECEMBER, 1895.

IMPORTS.

Country.	Silver bullion.	Gold ore.	Silver coin.	Gold bullion.	Gold coin.	Total.
British Columbia	.....	.....	.....	$287,387	.....	$287,387
British Possessions in Australasia	.....	.....	.....	.....	$487,502	487,502
China	.....	.....	$290	.....	.....	290
French Possessions	.....	.....	4,210	.....	640	4,850
Guatemala	.....	.....	8,748	.....	.....	8,748
Hawaiian Islands	.....	.....	50,000	.....	.....	50,000
Japan	.....	.....	2,921	.....	1,015	3,936
Mexico	$1,259,659	$12,237	691,535	582,291	77,460	2,623,182
San Salvador	.....	.....	2,650	.....	25,000	27,650
All other island ports	.....	.....	565	.....	.....	565
Total	1,259,659	12,237	760,919	869,678	591,617	3,494,110

EXPORTS.

Country	Silver bullion.	Foreign silver coin.	Gold bullion.	Gold coin.	Total.
China	$4,076,600	$769,600	.....	.....	$4,846,200
Costa Rica	.....	.....	.....	$3,000	3,000
Guatemala	327,420	.....	.....	15,500	342,920
Hongkong	1,259,050	4,024,872	$5,035	116,840	5,405,797
Hawaiian Islands	.....	.....	.....	470,000	470,000
Japan	2,439,541	270,749	.....	5,130	2,715,420
Mexico	.....	9,000	.....	3,700	12,700
San Salvador	.....	925	.....	.....	925
Total	8,102,611	5,075,146	5,035	614,170	13,796,962

THE COURSE OF SILVER IN 1895.

The price of bar silver, British standard 0.925 fine, in London on January 2, 1895, was 27¼d., equivalent to $0.59993 per ounce fine.

During the early part of the year it hovered at about 27½d. per ounce, British standard ($0.60481 per ounce fine), reaching as high as 27 11/16d. ($0.60911 per ounce fine) in February. In the first months of the year there was a fair demand for China. About the month of March large shipments were made to Chile for coinage purposes, and the price rose rapidly to 29d. ($0.63943 per ounce fine). Peace between China and Japan led to heavy speculative purchases, it being assumed that the payment of China's war indemnity to Japan would require a large amount of the metal, and 30¾d. ($0.67525 per ounce fine) was reached. Weak holders realized while Chinese banks were selling, the result being a rapid decline of the market. Still, silver remained many months above the Chinese par of exchange, because regular tenders were being made for the Paris mint, which was replacing the Italian fractional currency and also coining for eastern colonies. In October the price touched 31⅜d. ($0.68978 per ounce fine). This rise was caused by the belief that a large share of the Chinese war indemnity would be made payable in silver.

The highest price during the year was 31⅜d., the lowest 27 3/16d., and the average 29⅞d., corresponding to $0.68978, $0.59855, and $0.65806 per ounce fine, respectively.

HIGHEST, LOWEST, AND AVERAGE PRICE OF SILVER BULLION AND VALUE OF A FINE OUNCE EACH MONTH DURING THE CALENDAR YEAR 1895.

Month.	Highest.	Lowest.	Average price per ounce, British standard, 0.925.	Equivalent value of a fine ounce with exchange at par ($4.8665).	Average monthly price at New York of exchange on London.	Equivalent value of a fine ounce based on average monthly price and average rate of exchange.	Average monthly New York price of fine bar silver.
1895.	*Pence.*	*Pence.*	*Pence.*				
January	27 7/16	27 3/16	27.331	$0.59914	$4.8897	$0.60190	$0.60726
February	27 11/16	27½	27.440	.60152	4.8852	.60444	.60910
March	29⅛	27⅝	28.337	.62119	4.8949	.62447	.63125
April	30⅝	29⅛	30.415	.66674	4.8946	.67059	.67692
May	30⅝	30 3/16	30.625	.67133	4.8800	.67289	.67769
June	30 11/16	30 5/16	30.460	.66771	4.8934	.67139	.67440
July	30⅝	30 5/16	30.439	.66727	4.9000	.67187	.67884
August	30⅛	30¼	30.393	.66625	4.9027	.67122	.67388
September	30 5/16	30 7/16	30.489	.66836	4.8955	.67234	.67848
October	31⅛	30⅝	30.928	.67798	4.8811	.68010	.68712
November	31	30⅝	30.789	.67493	4.8920	.68592	.68546
December	30 11/16	30	30.395	.66631	4.8912	.66963	.67675
Average			29.836	.65406	4.8917	.65806	.66268

STOCK OF MONEY IN THE UNITED STATES.

The estimated stock of gold and silver coin in the United States on January 1, 1896, was, gold, $567,055,957; silver, $500,438,966; a total of $1,067,494,923.

OFFICIAL TABLE OF STOCK OF COIN IN THE UNITED STATES JANUARY 1, 1896.

Items.	Gold.	Silver.	Total.
Estimated stock of coin Jan. 1, 1896	$577,182,792	$499,036,459	$1,076,219,251
Coinage, calendar year 1895	59,616,358	5,698,010	65,314,368
Total	636,799,150	504,734,469	1,141,533,619
Loss:			
Net exports of United States coin calendar year 1895	67,133,451	246,972	67,380,423
United States coin melted for recoinage, calendar year 1895	1,109,742	3,948,531	5,058,273
United States coin used in the arts, calendar year 1895 (estimated)	1,500,000	100,000	1,600,000
Total	69,743,193	4,295,503	74,038,696
Estimated stock of the United States coin Jan. 1, 1896	567,055,957	500,438,966	1,067,494,923

NOTE.—Of the silver coins $423,289,629 were in dollars and $77,149,337 were in subsidiary coins.

The gold and silver coins melted for recoinage are given at their nominal values and include transfers from the Treasury and mutilated coins purchased at mints and assay offices.

The following table shows the value of the gold and silver bullion in the mints and assay offices owned by the Government on January 1, 1896:

GOLD AND SILVER BULLION IN MINTS AND ASSAY OFFICES JANUARY 1, 1896.

Metal.	Cost value.
Gold	$29,443,955
Silver	124,695,697
Total	154,139,652

The stock of silver bullion on deposit with the Mercantile Safe Deposit Company in New York City on January 1, 1896, was 143,055 fine ounces, of the commercial value of $95,911.

The total metallic stock of the United States on January 1, 1896, consisting of the stock of coin in the United States, the gold and silver bullion owned by the Government, and the silver bullion held by the Mercantile Safe Deposit Company, was as follows:

METALLIC STOCK JANUARY 1, 1896.

Coin and bullion.	Amount.
Gold	$596,499,912
Silver (bullion in mints and held by Mercantile Safe Deposit Company)	625,230,574
Total	1,221,730,486

The estimated metallic stock of the United States on January 1, 1895, was as follows:

METALLIC STOCK JANUARY 1, 1895.

Coin and bullion.	Amount.
Gold	$624,289,758
Silver (bullion in mints and held by Mercantile Safe Deposit Company)	625,192,694
Total	1,249,482,452

A comparison of the above tables shows that during the calendar year the stock of gold decreased $27,789,846, while that of silver increased $37,880, a total decrease of $27,751,966.

The following table shows the stock of metallic and paper money in the United States on January 1, 1896:

LOCATION OF THE MONEYS OF THE UNITED STATES JANUARY 1, 1896.

Moneys.	In Treasury.	Outside of Treasury.	Total.
Metallic:			
Gold bullion	$29,443,955		$29,443,955
Silver bullion	124,695,697	$95,911	124,791,608
Gold coin	83,186,960	483,868,997	567,055,957
Silver dollars	364,225,853	59,063,776	423,289,629
Subsidiary silver coin	12,849,573	64,299,764	77,149,337
Total	614,402,038	607,328,448	1,221,730,486
Paper:			
Legal-tender notes, old issue	116,271,804	230,409,212	346,681,016
Legal-tender notes, act July 14, 1890	22,520,006	115,251,274	137,771,280
Gold certificates	164,860	49,935,029	50,099,889
Silver certificates	10,077,915	335,624,589	345,702,504
National-bank notes	7,048,052	206,668,921	213,716,973
Currency certificates	3,745,000	31,135,000	34,880,000
Total	159,827,637	969,024,025	1,128,851,662

The total amount of money in circulation in the United States on January 1, 1896, was $1,576,352,473, while the amount on January 1, 1895, was $1,624,609,592, showing a decrease in the circulation of $48,257,119 on January 1, 1896.

GOLD AND SILVER USED IN THE INDUSTRIAL ARTS.

The amount of gold and silver used in the industrial arts in the United States during the calendar year 1895 has been ascertained, as in former years, by making inquiries of the Government institutions and the private refineries.

In answer to these inquiries statements were received showing the amount and value of gold and silver bars sold to manufacturers and jewelers for industrial use and, as nearly as possible, the class of material used in the manufacture of such bars.

The weight and value of gold and silver bars furnished manufacturers and jewelers by the United States assay office at New York during the calendar year 1895 was as follows:

BARS MANUFACTURED FOR USE IN THE INDUSTRIAL ARTS BY THE UNITED STATES ASSAY OFFICE AT NEW YORK DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
United States coin			1,384.92	$1,790.60
Domestic bullion	327,437.721	$6,768,738.42	5,301,347.20	6,854,267.09
Foreign material	22,285.942	460,691.31	652,692.50	843,885.24
Old plate, jewelry, etc.	89,246.013	1,844,878.81	597,028.77	771,916.00
Total	438,969.676	9,074,308.54	6,552,453.39	8,471,858.93

The weight and value of gold and silver in bars furnished manufacturers and jewelers by the United States mint at Philadelphia during the calendar year 1895 was as follows:

VALUE AND COMPOSITION OF BARS MANUFACTURED FOR USE IN THE INDUSTRIAL ARTS BY THE UNITED STATES MINT AT PHILADELPHIA DURING THE CALENDAR YEAR 1895.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	40,350.311	$834,114.95	140.30	$181.40
United States coin	1,896.339	39,200.82		
Jewelry, etc	3,624.559	74,926.28	37,332.96	48,268.88
Total	45,871.209	948,242.05	37,473.26	48,450.28

The weight and value of gold and silver in bars furnished manufacturers and jewelers by the private refineries in the United States during the calendar year 1895 was as follows:

BARS FOR INDUSTRIAL USE FURNISHED GOLDSMITHS AND OTHERS BY PRIVATE REFINERIES DURING THE CALENDAR YEAR 1895.

Material used.	Gold bars manufactured.		Silver bars manufactured.	
	Fine ounces.	Value.	Fine ounces.	Coining value
Domestic bullion (exclusive of United States bars)	42,519	$878,936	2,297,836	$2,970,939
United States bars	30,636	633,292	1,326,521	1,715,098
United States coin	8,361	172,845		
Old plate, jewelry, and other old material	51,106	1,056,464	431,540	557,951
Foreign bullion and coin	500	10,336	100,250	129,616
Total	133,122	2,751,873	4,156,147	5,373,604

Number of firms addressed, 49; number replying, 46; number not manufacturing, 21; number manufacturing, 25.

The value of United States bars—bars bearing the stamp of a United States mint or assay office—was, gold, $633,292; silver, $1,715,098.

These bars are manufactured by Government institutions and are included in their tables, and in order to avoid duplication must be eliminated from the amounts reported by private refineries.

The weight and value of gold and silver bars, exclusive of United States bars, furnished by private refineries for industrial purposes during the calendar year 1895 was as follows:

BARS FOR INDUSTRIAL USE (EXCLUSIVE OF GOVERNMENT BARS) FURNISHED GOLDSMITHS AND OTHERS BY PRIVATE REFINERIES DURING THE CALENDAR YEAR 1895.

Material used.	Gold bars manufactured.		Silver bars manufactured.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	42,519	$878,936	2,297,836	$2,970,939
United States coin	8,361	172,845	.....	.....
Old plate jewelry, and other old material	51,106	1,056,464	431,540	557,951
Foreign bullion and coin	500	10,336	100,250	129,616
Total	102,486	2,118,581	2,829,626	3,658,506

The value of the gold and silver bars for industrial purposes furnished by Government institutions and private refineries during the calendar year 1895 was as follows:

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS DURING THE CALENDAR YEAR 1895, AND CLASSIFICATION OF THE MATERIAL USED.

Material used.	Gold.	Silver, coining value.	Total.
Domestic bullion	$8,481,789	$9,825,387	$18,307,176
United States coin	212,046	1,791	213,837
Old material	2,976,260	1,378,136	4,354,405
Foreign bullion and coin	471,027	973,501	1,444,528
Total	12,141,131	12,178,815	24,319,946

The value of gold and silver bars for industrial purposes furnished by Government institutions and private refineries during the calendar year 1894 was as follows:

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS DURING THE CALENDAR YEAR 1894, AND CLASSIFICATION OF THE MATERIAL USED.

Material used.	Gold.	Silver, coining value.	Total.
Domestic bullion	$6,430,073	$8,579,472	$15,009,545
United States coin	396,167	.....	396,167
Foreign bullion and coin	543,585	982,399	1,525,984
Old material	2,184,946	1,221,177	3,406,123
Total	9,554,771	10,783,048	20,337,819

A comparison of the values of the precious metals used in the industrial arts in the United States during the calendar years 1894 and 1895 shows an increase during the latter year of $2,586,360 in gold and $1,395,767 in silver.

Government institutions and private refineries report that during the calendar year 1895 there were $212,046 in United States gold coin and $1,791 in United States silver coin consumed in the manufacture of bars for industrial purposes.

There are no returns showing the actual amount of United States gold and silver coins melted down by goldsmiths and jewelers, as the amount thus consumed would not appear in the reports of institutions manufacturing bars.

Assuming the total amount of United States gold coin used in the arts to be $1,500,000 and silver coin $100,000, the industrial consumption of the precious metals in the United States during the calendar year 1895 would be as follows:

INDUSTRIAL CONSUMPTION OF THE PRECIOUS METALS DURING THE CALENDAR YEAR 1895.

Material used.	Gold.	Silver, coining value.	Total.
Domestic bullion	$8,481,783	$9,825,387	$18,307,176
United States coin	1,500,000	100,000	1,600,000
Old material	2,976,269	1,378,136	4,354,405
Foreign bullion and coin	471,027	973,501	1,444,528
Total	13,429,085	12,277,024	25,706,109

GOLD BARS EXCHANGED FOR GOLD COIN, 1895.

Month.	Philadelphia.	New York.	Total.
January	$85,593.29	$2,218,344.68	$2,303,937.97
February	95,526.71	659,125.46	754,652.17
March	75,354.65	349,107.84	424,462.49
April	50,206.91	327,048.72	377,255.63
May	60,230.96	334,011.42	394,242.38
June	90,366.61	390,406.60	480,773.21
July	55,259.65	440,895.40	496,155.05
August	65,383.22	528,480.49	593,863.71
September	65,262.03	760,158.90	825,420.93
October	85,480.31	784,356.20	869,836.51
November	70,299.22	5,892,161.59	5,962,460.81
December	35,151.39	12,442,526.15	12,477,677.54
Total	834,114.95	25,126,623.45	25,960,738.40

All the gold bars ($834,114.95) exchanged for gold coin at Philadelphia, and $6,768,738.42 of the amount of gold bars exchanged for gold coin at New York, under the provisions of the act of May 26, 1882, were employed in the industrial arts. The remainder of the total bars exchanged, viz, $18,357,885.03, was exported.

The following table shows the amounts and the classification of the material used in the industrial arts in the United States each year since 1880:

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS, AND CLASSIFICATION OF THE MATERIAL USED, DURING THE CALENDAR YEARS 1880–1895.

GOLD.

Calendar year.	United States coin.	New material.	Old material.	Foreign bullion and coin.	Total.
1880	$3,300,000	$6,000,000	$395,000	$1,267,600	$10,962,600
1881	2,700,000	7,000,000	522,900	1,547,800	11,770,700
1882	2,500,000	7,000,000	696,500	671,500	10,868,000
1883	4,875,000	7,840,000	1,549,300	194,500	14,458,800
1884	5,000,000	6,000,000	3,114,500	385,500	14,500,000
1885	3,500,000	6,736,927	1,408,902	178,913	11,824,742
1886	3,500,000	7,003,480	1,928,046	638,003	13,069,529
1887	3,500,000	9,090,342	1,835,882	384,122	14,810,346
1888	3,500,000	9,893,057	2,402,976	718,809	16,514,842
1889	3,500,000	9,686,827	3,218,971	291,258	16,697,056
1890	3,500,000	10,717,472	3,076,426	362,062	17,655,960
1891	3,500,000	10,697,679	4,860,712	628,525	19,686,916
1892	3,500,000	10,588,703	4,468,685	771,686	19,329,074
1893	1,500,000	8,354,482	2,777,165	804,254	13,435,901
1894	1,500,000	6,430,073	2,184,946	543,585	10,658,604
1895	1,500,000	8,481,789	2,976,269	471,027	13,429,085
Total	50,875,000	131,520,831	37,417,180	9,859,144	229,672,155

SILVER (COINING VALUE).

1880	$600,000	$5,000,000	$145,000	$353,000	$6,098,000
1881	200,000	5,900,000	178,000	371,000	6,649,000
1882	200,000	6,344,300	212,900	440,300	7,197,500
1883	200,000	4,623,700	561,900	155,000	5,540,600
1884	200,000	4,500,000	170,000	650,000	5,520,000
1885	200,000	4,539,875	462,186	62,708	5,264,769
1886	200,000	3,626,195	404,155	825,615	5,055,965
1887	200,000	4,102,734	480,606	654,991	5,438,331
1888	200,000	6,477,857	652,047	771,985	8,101,889
1889	200,000	7,297,933	611,015	657,997	8,766,945
1890	200,000	7,143,635	640,100	1,245,419	9,229,154
1891	200,000	7,289,073	858,126	1,256,101	9,603,300
1892	200,000	7,204,210	647,377	1,249,801	9,301,388
1893	100,000	6,570,737	1,222,836	1,740,704	9,634,277
1894	100,000	8,579,472	1,221,177	982,399	10,883,048
1895	100,000	9,825,387	1,378,136	973,501	12,277,024
Total	3,300,000	99,025,108	9,845,561	12,390,521	124,561,190

THE WORLD'S PRODUCTION OF GOLD AND SILVER IN 1895.

The world's production of gold in 1895 was 301,361 kilograms, or 9,688,821 ounces, fine, of the value of $200,285,700, against 273,197 kilograms, or 8,783,342 ounces, fine, of the value of $181,567,800 in 1894, an increase in weight of 28,164 kilograms, or 905,479 ounces, fine, of the value of $18,717,900.

The world's output of silver in 1895 was, approximately, 5,263,183 kilograms, or 169,180,249 ounces, fine, of the commercial value (at the average price of silver during the year) of $110,654,000 and coining value of $218,738,100, as compared with the silver product of 1894 of 5,121,017 kilograms, or 164,610,394 ounces, fine, of the commercial value (at the average price of silver during 1894) of $104,493,000 and the coining value of $212,829,600, showing an increase in the product of 1895 over 1894 of the commercial value of $6,161,000 and the coining value of $5,908,500.

The countries whose gold product shows an increase in 1895 over 1894 are:

United States	$7,110,000
Australasia	3,037,500
Mexico	1,500,000
Russia	4,761,000
Germany	162,800
Dominion of Canada	868,800
Chile	943,200
Uruguay	11,800
Japan	27,300
Africa	4,283,900
British India	873,000
Korea	232,000
Great Britain	41,200
Austria-Hungary	181,800
Total	24,034,300

The countries whose gold product shows a decrease as compared with 1894 are:

Sweden	$10,000
British Guiana	97,000
Dutch Guiana	163,000
Peru	10,600
China	5,035,800
Total	5,316,400

The countries whose silver product shows an increase over that of 1894 are:

United States	$8,051,000
Russia	162,700
Norway	57,300
Spain	1,920,100
Chile	2,820,400
Dominion of Canada	1,199,800
Japan	269,600
Great Britain	32,800
Total	14,513,700

The countries whose output of silver in 1895 shows a decrease compared with that of 1894 are:

Australasia	$1,196,800
Mexico	87,800

Germany	$498,700
Sweden	69,900
Peru	95,400
Austria-Hungary	646,800
Total	8,605,200

The following table shows the production of the precious metals in the world for the calendar years 1860 to 1895:

PRODUCT OF GOLD AND SILVER IN THE WORLD, 1860–1895.

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1860	6,486,262	$134,083,000	29,095,428	$39,337,000	$37,618,000
1861	5,949,582	122,989,000	35,401,972	46,191,000	45,772,000
1862	5,949,582	122,989,000	35,401,972	47,651,000	45,772,000
1863	5,949,582	122,989,000	35,401,972	47,616,000	45,772,000
1864	5,949,582	122,989,000	35,401,972	47,616,000	45,772,000
1865	5,949,582	122,989,000	35,401,972	47,368,000	45,772,000
1866	6,270,086	129,614,000	43,051,583	57,646,000	55,663,000
1867	6,270,086	129,614,000	43,051,583	57,173,000	55,663,000
1868	6,270,086	129,614,000	43,051,583	57,086,000	55,663,000
1869	6,270,086	129,614,000	43,051,583	57,043,000	55,663,000
1870	6,270,086	129,614,000	43,051,583	57,173,000	55,663,000
1871	5,591,014	115,577,000	63,317,014	83,958,000	81,864,000
1872	5,591,014	115,577,000	63,317,014	83,705,000	81,864,000
Total	78,766,630	1,628,252,000	547,997,231	729,563,000	708,521,000
1873	4,653,675	96,200,000	63,267,187	82,120,800	81,800,000
1874	4,390,031	90,750,000	55,300,781	70,674,400	71,500,000
1875	4,716,563	97,500,000	62,261,719	77,578,100	80,500,000
1876	5,016,488	103,700,000	67,753,125	78,322,600	87,600,000
1877	5,512,196	113,947,200	62,679,916	75,278,600	81,040,700
1878	5,761,114	119,092,800	73,385,451	84,540,000	94,882,200
1879	5,262,174	108,778,800	74,383,495	83,532,700	96,172,600
1880	5,148,880	106,436,800	74,795,273	85,640,600	96,705,000
1881	4,983,742	103,023,100	79,020,872	89,925,700	102,168,400
1882	4,934,086	101,996,600	86,472,091	98,232,300	111,802,300
1883	4,614,588	95,392,000	89,175,023	98,984,300	115,297,000
1884	4,921,169	101,729,600	81,507,801	90,785,000	105,461,400
1885	5,245,572	108,435,600	91,609,950	97,518,800	118,445,200
1886	5,135,679	106,163,900	93,297,290	92,793,500	120,626,800
1887	5,116,861	105,774,900	96,123,586	94,031,000	124,281,000
1888	5,330,775	110,196,900	108,827,606	102,185,900	140,706,400
1889	5,973,790	123,489,200	120,213,611	112,414,100	155,427,700
1890	5,749,306	118,848,700	126,095,062	131,937,000	163,032,000
1891	6,320,194	130,650,000	137,170,919	135,500,200	177,352,300
1892	7,094,266	146,651,500	153,151,762	133,404,400	198,014,400
1893	7,618,811	157,494,800	165,472,621	129,119,900	213,944,400
1894	8,783,342	181,567,800	164,610,394	104,493,000	212,829,600
1895	9,688,821	200,285,700	169,180,249	110,654,000	218,738,100
Total	131,972,123	2,728,105,900	2,295,815,793	2,259,666,900	2,968,327,500
Grand total	210,738,753	4,356,357,900	2,843,813,024	2,989,229,900	3,676,848,500

WORLD'S COINAGE, 1893, 1894, AND 1895.

In the appendix will be found a table, revised from the latest information received, exhibiting the coinages of the various countries of the world during the calendar years 1893, 1894, and 1895. The following is a summary of the same:

COINAGE OF NATIONS.

Calendar year.	Gold.	Silver.
1893	$232,420,517	$137,952,690
1894	227,921,032	113,095,788
1895	230,701 438	121,996,219

The above figures represent, as nearly as this Bureau has been able to ascertain, the total value of the gold and silver coinages executed in the world during the years therein named.

It must be borne in mind, however, that the total of these coinages does not correctly represent the amount of new gold and new silver made into coins during the year, for the reason that the coinages as reported include the value of domestic and foreign coins melted for recoinage, as well as old material, plate, etc., used in coinage.

In the circular letter of inquiry prepared at this Bureau and sent to foreign Governments through the Department of State, asking for information on these subjects, it was especially requested that each country report the amount of such recoinages. This has been done in many instances, but not in all.

The following table exhibits the number of fine ounces and value of gold and silver coinage of the world, by calendar years, from 1873 to 1895:

COINAGE OF GOLD AND SILVER OF THE MINTS OF THE WORLD FOR THE CALENDAR YEARS 1873-1895.

Calendar year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
1873	12,462,890	$257,630,802	101,741,421	$131,544,464
1874	6,568,279	135,778,387	79,610,875	102,931,232
1875	9,480,892	195,987,428	92,747,118	119,915,467
1876	10,309,645	213,119,278	97,899,525	126,577,164
1877	9,753,196	201,616,466	88,449,796	114,359,332
1878	9,113,202	188,386,611	124,671,870	161,191,913
1879	4,390,167	90,752,811	81,124,555	104,888,313
1880	7,242,951	149.725,081	65,442,074	84,611,974
1881	7,111,864	147,015,275	83.539,051	108,010,086
1882	4,822,851	99,697,170	85,685,996	110,785,934
1883	5,071,882	104,845,114	84,541,904	109,306,705
1884	4,810,061	99.432,795	74,120,127	95,832,084
1885	4,632,273	95,757,582	98,044,475	126,764,574
1886	4,578,310	94,642,070	96,566,844	124,854,101
1887	6,046,510	124,992,465	126,388,592	163,411,387
1888	6,522,346	134,828,855	104,354,000	134,922,344

COINAGE OF GOLD AND SILVER OF THE MINTS OF THE WORLD FOR THE CALENDAR YEARS 1873–1895—Continued.

Calendar year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
1889	8,170,611	$168,901,519	107,788,256	$139,362,595
1890	7,219,725	149,244,965	117,789,228	152,293,144
1891	5,782,463	119,534,122	106,962,049	138,294,367
1892	8,343,387	172,473,124	120,282,947	155,517,347
1893	11,243,342	232,420,517	106,097,783	137,952,690
1894	11,025,680	227,921,032	87,472,523	113,095,788
1895	11,160,182	230,701,438	94,356,450	121,996,219
Total	175,862,709	3,635,404,907	2,226,277,369	2,878,419,234

THE WORLD'S INDUSTRIAL CONSUMPTION OF THE PRECIOUS METALS IN 1895.

I.—GOLD.

In the circular of the Bureau of the Mint for 1895, addressed to foreign Governments through our representatives abroad, are the following interrogatories relative to the industrial consumption of gold and silver during the calendar year 1895:

"What was the weight of fine gold used in the industrial arts during the calendar year 1895?" "What amount of this was new gold and what amount old gold?" "What was the weight of fine silver used in the industrial arts during the calendar year 1895?" "What amount of this was new silver and what amount old silver?"

The interrogatories in the circular for 1894 relating to the industrial consumption of gold and silver were as follows:

"What was the weight and value of the gold used in the industrial arts during the year?" "Same question as to silver?"

The interrogatories on the same subject for the calendar year 1893, the first year for which they were formulated, were the same as for 1894.

Answers giving partial information were received to these interrogatories for 1895 or 1894 from Austria-Hungary, France, the Netherlands, Portugal, Russia, Sweden, and Switzerland. The answers from all other countries, except Ecuador, for 1894 were to the effect that no statistics of the industrial consumption of the precious metals were obtainable. It is gratifying, however, to be able to state that foreign Governments are beginning to take a greater interest in the collection of such statistics. This is notably the case in France, Austria-Hungary, the Netherlands, Portugal, and Sweden. It is probable that in the near future Germany also will collect the statistics of the industrial consumption of the precious metals. But even in the case of the countries that already send answers to our interrogatories the information furnished is not always as definite or complete as could be desired, and it is still true, as has been remarked by Prof. W. Lexis in his recent article on the "Production and employment of the precious metals in the last ten years," in Conrad's Jahrbüchern, "that our knowledge of the industrial consumption of gold and silver, even

in those countries in which the Government requires gold and silver ornaments and other articles to be stamped, is unsatisfactory. Data collected by private individuals, like those of the late Dr. Soetbeer, for instance, can afford no entirely trustworthy results."

"It is very much to be desired," adds Professor Lexis, "that in Germany, as in the United States, a circular letter of inquiry should be addressed, from time to time, from some official source, from the imperial treasury, for instance, to manufacturers of articles of gold and silver, and that the quantities of the precious metals employed by them in the arts, as well as the kind of material used, be ascertained."

1. *Austria-Hungary.*—In answer to the interrogatories for 1895, this Bureau has been informed that the fine gold used for industrial purposes in Austria-Hungary in 1895 was "nearly 3,200 or 3,500 kilograms." It may be assumed to be about 3,350 kilograms, fine, the mean of the above figures.

Belgium and the Netherlands.—In answer to the interrogatories relating to the industrial consumption of gold in the Netherlands in 1895, this Bureau received the following information: "At the guaranty bureaus 752 kilograms of new gold articles were presented for registration and stamping. The value of these articles may be estimated at $302,304. What amount of new gold was used in the industrial arts can not be stated."

It is evident that the data here given furnish no sufficient basis for an estimate of the industrial consumption of gold in the Netherlands in 1895. In the absence of more definite data the estimate of that consumption made by Dr. Soetbeer for the Netherlands and Belgium in 1885, viz, 2,900 kilograms net, with an addition of 200 kilograms for increase during the last ten years, makes the industrial gold consumption of the two last-named countries for 1895 3,100 kilograms net.

3. *England.*—The Bureau of the Mint has received no official information as to the industrial gold consumption of England in 1895, and recourse is therefore had to an estimate of the same. According to the memorandum by Mr. W. Chandler Roberts-Austen, chemist and assayer, published in the Reports of the Deputy Master of the Royal Mint, London, for 1893–1894, and 1895, the number of ounces of gold wares assayed and marked by the wardens of the assay offices at Birmingham and Chester from 1889 to 1895 inclusive, was as follows:

Year.	Birmingham.	Chester.	Total.
	Ounces, troy.	*Ounces, troy.*	*Ounces, troy.*
1889	158,769	41,883	200,652
1890	193,426	51,166	244,592
1891	230,136	53,715	283,851
1892	228,018	55,789	283,807
1893	229,016	61,318	290,334
1894	223,759	62,442	286,201
1895	239,472	73,283	312,755
Total	1,502,596	399,596	1,902,192

These figures are far from representing the total industrial gold consumption of the United Kingdom, which must, if we are to be guided by earlier estimates, be placed at at least twice these amounts for the years 1889–1895. Lexis thinks it may be 500,000 ounces, or about 15,500 kilograms net, which figure is here adopted.

4. *France.*—M. de Foville, Director of the Mint, Paris, states that the fine weight of the gold employed in the industrial arts in France in 1895 may be estimated at 19,000 kilograms, but that the administration had no data to enable it to answer the interrogatory in regard to the amount of new gold so used during the year. It is highly probable, however, that some part of the 19,000 kilograms of gold reported as used in industry in 1895 was "old material," probably 20 per cent, or one-fifth. This is the percentage of the total consumption of gold in France assumed by Dr. Soetbeer, in his table of the industrial consumption of gold in the world in 1871–1880, to have consisted of such material. Twenty per cent of 19,000 kilograms is 3,800 kilograms, which would leave the net consumption of gold in France in 1895 for industrial purposes 15,200 kilograms.

Since 1893 there seems to have been a steady increase in the industrial employment of the precious metals in France. M. de Foville has supplied the following data of the gross amount of gold thus used in 1892–1894, as follows:[1]

	Kilograms, fine.
1892	17,294
1893	15,595
1894	18,095

It is worthy of note that the quantities of gold subjected to the guaranty stamp in France is much smaller than that of the total industrial consumption. The quantities from 1883 to 1892 were as follows:

Year.	Imported wares.	Of French manufacture.
	Kilograms.	*Kilograms.*
1883	822	11,949
1884	761	9,990
1885	955	8,435
1886	664	7,736
1887	659	7,505
1888	685	7,411
1889	233	7,662
1890	840	7,598
1891	826	7,501
1892	8,139	

In 1893 there was a total quantity of 8,067 kilograms stamped. The above figures indicate a decrease of articles of French manufacture and an increase of imported articles.

[1] See "Tabellen zur Währungs-Statistik," Sechster Abschnitt, p. 140, Vienna, 1896.

In the table of the world's industrial consumption of gold that of France in 1895 appears at 15,200 kilograms, of the value of $10,101,920.

5. *Germany.*—Germany's industrial consumption of gold was estimated by Dr. Soetbeer in 1885 at about 12,000 kilograms net. Lexis estimates it at the same figure in 1896. It is probably nearer 13,200 kilograms, at which figure it is placed here.

6. *Italy.*—In 1885 Dr. Soetbeer estimated the net industrial consumption of gold in Italy at 4,500 kilograms. It is not improbable that it has since increased to 5,000 kilograms net.

7. *Portugal.*—The employment of gold in the arts in 1895 in Portugal was returned as 1,756 kilograms. Deducting 20 per cent for old material used leaves it, in round numbers, 1,400 kilograms net.

8. *Russia.*—Russia's industrial consumption of gold in 1895 was 4,940.967633 kilograms. Deducting 20 per cent for old material used leaves it, in whole numbers, 3,952.7741064 kilograms, of the value of $2,627,013.

9. *Sweden.*—The information from Sweden relative to the industrial consumption of gold in 1895 is as follows: "The weight of fine gold which was used in 1895 for the making of gold objects may be calculated at 337 kilograms. The weight of fine gold employed for gilding and other trades is unknown. Of the fine gold employed for the making of gold objects about one-half may be supposed to have been new gold. The rest consisted mostly of gold coin and a small portion of old gold objects." Deducting about 10 per cent for the small part of old gold objects included in the 337 kilograms given above as the total industrial gold consumption of Sweden in 1895, leaves a net industrial employment of gold in that country of 304 kilograms net, of the value of $202,038.40. No deduction is made for the gold coin melted down and used, because, as remarked by Dr. Soetbeer—

> It is immaterial for the problem of prices and of standards of value whether newly produced and uncoined gold or gold coin melted down is used for these purposes. The increment to the monetary supply of gold from the annual gold production is only that sum by which the product exceeds the use in the arts, the export to the East, and any loss from accident. We are inclined to agree that half or perhaps more of the gold used in the arts (after deducting the old articles remelted) is obtained by melting coins; but this is of no importance so far as the monetary gold supply and the level of prices are concerned.

10. *Switzerland.*—Returns for 1894 and 1895 place the value of the gold and silver used for industrial purposes in Switzerland at a total of 40,000,000 francs, the greater part of that sum representing gold.

From the Tabellen zur Währungs-Statistik, Sechster Abschnitt, Vienna, 1890, page 134, we learn that 37,000,000 francs of this amount was gold and 3,000,000 francs silver. Assuming 20 per cent of the consumption of gold to have been old material, leaves a net industrial gold consumption in 1895 of 29,600,000 francs, or in round numbers $5,920,000, representing 8,907 kilograms.

11. *Other countries.*—The industrial consumption of gold in civilized

countries other than the United States and those mentioned above may be reasonably assumed to be 2,500 kilograms.

Reducing the above estimate to tabular form, the world's industrial consumption of gold in 1895 may be placed at 88,142 kilograms, of the value of $58,579,160, as follows:

THE WORLD'S INDUSTRIAL CONSUMPTION OF GOLD IN 1895.

Country.	Weight.	Value.
	Kilograms.	
Austria-Hungary	3,350	$2,226,410
Belgium	3,100	2,060,260
Netherlands		
England	15,500	10,301,300
France	15,200	10,101,920
Germany	13,200	8,772,720
Italy	5,000	3,323,000
Portugal	1,400	930,440
Russia	3,053	2,627,164
Sweden	304	202,038
Switzerland	8,907	5,919,592
United States	15,728	10,452,816
Other countries	2,500	1,661,500
Total	88,142	58,579,160

II.—SILVER.

The interrogatories relative to the industrial consumption of silver contained in the Bureau of the Mint's Circular for 1895 and 1894, respectively, were in every respect similar to those relating to the industrial consumption of gold.

1. *Austria-Hungary.*—According to the Tabellen zur Währungs-Statistik, Sechster Abschnitt, Vienna, 1896, the fine weight of the articles of silver of domestic manufacture marked at the bureaus of guaranty of the Kingdom and countries represented in the Reichsrath in the year 1894 was 43,245.028 kilograms, and of Hungary, 5,164.208 kilograms; a total of 48,453 kilograms.

The figure 43,245 kilograms, however, does not represent the total industrial consumption of silver in Austria-Hungary in 1894. According to official data collected in 1894 and supplemented by estimates, the amount of fine silver employed in the arts that escaped control in the Austrian half of the Empire amounted to 7,609 kilograms, making the total industrial consumption of silver in Cisleithania (Austria-Hungary, exclusive of the eastern half), 51,854 kilograms. In galvanic silvering and silver plating, 3,975 kilograms; in photography, 2,468 kilograms, and in mirror foiling, 482 kilograms were used.

The total industrial consumption of Hungary, calculated proportionally as for Austria, would be 6,000 kilograms. The silver used in manufactures in the Austrian half of the Empire consisted of 90.3 per

cent of fine silver, 4 per cent of domestic or foreign coins, 3.59 per cent of alloyed silver, and of only 2.11 per cent of broken silver. Even if it be assumed that the alloyed silver was obtained exclusively by the melting or broken silver, this material which had been already used industrially once would not reach 6 per cent. But as the melted coins were for the most part domestic coins melted down, whose place by reason of the Austro-Hungarian monetary reform had not to be filled by coinages of new silver, they, too, may be considered "old material." For this reason Professor Lexis thinks that the net industrial consumption of fine silver in Austria-Hungary in 1894 should be placed at about 52,000 kilograms. It was, according to official information received by this Bureau, 58,000 kilograms in 1895.

2. *Belgium.*—The Bureau of the Mint has received no official information as to the industrial consumption of silver in Belgium in 1895, and therefore adopts Professor Lexis's estimate for that year, viz, 20,000 kilograms net.

3. *England.*—Professor Lexis estimates the net industrial consumption of silver in England in 1895 at 140,000 kilograms, and, in the absence of more reliable data, that estimate is accepted by this Bureau as a close approximation to the actual amount industrially employed in that country. Professor Lexis says:

> In view of the estimate made of the industrial employment of silver in France (141,000 kilograms), and that of the United States in 1894 (232,000 kilograms), the figure assumed by Mr. Ottomar Haupt to represent the net industrial consumption of silver in England in 1890 seems decidedly too low. Nor do the statistics of the consumption of crude silver in England published by the Frankfurt Metallgesellschaft, based on the imports and exports and the estimated domestic production of silver, inspire much confidence. For 1893 and 1894 the figures are 213,000 and 234,000 kilograms, while for 1891 and 1892 they show an export of crude silver (1,647,000 kilograms and 923,000 kilograms) greater than the sum of the domestic production (600,000 and 926,000 kilograms) and imports of crude silver (974,000 and 926,000 kilograms) by 121,000 and 104,000 kilograms, respectively. But, besides these items, the imported and exported foreign silver coins should have been taken into consideration, since they, too, may be employed as industrial raw material. If these be included, the average annual industrial consumption of silver in England is found to be 206,000 kilograms. For coinage there was used, after deduction of the abraded coins recoined during this period, an annual average of 97,000 kilograms of fine silver, and hence 113,000 kilograms were used annually for other purposes. The principal bases of this calculation, especially the estimate of the silver obtained from foreign ores, are very uncertain, and when we compare the silver consumption of the United States and France with that of England we feel disposed to place the industrial employment of silver in the latter country at at least as high a figure as that of France.

Professor Lexis accordingly estimates it at 140,000 kilograms net.

4. *France.*—M. de Foville estimates the industrial consumption of silver in France in 1895 at 189,000 kilograms. Assuming 25 per cent of this to have been old material, leaves a net industrial consumption of 141,750 kilograms.

5. *Germany.*—The tables of the Metallgesellschaft give as Germany's

average industrial consumption of crude silver in the years 1890–1894, 175,000 kilograms, to which must be added 8,500 kilograms, representing the excess of the imports of silver coin over the exports. The silver employed in coinage need not be deducted, as it is obtained exclusively from the melting of thalers. There is therefore a net consumption for Germany for industrial purposes of 183,500 kilograms. Considering the large export of silverware from Germany and the great development of the silvering, silver-plating, and chemical industries of that country, Professor Lexis does not consider this estimate at all incredible; still he hesitates to adopt it, especially as Ottomar Haupt placed Germany's industrial use of silver at only 100,000 kilograms in 1890. Lexis is of opinion that 150,000 kilograms may be assumed without any hesitancy to represent the industrial employment of silver in the Empire in 1895.

6. *Italy.*—In 1885 Dr. Soetbeer estimated the industrial consumption of silver in Italy to be 19,000 kilograms, since when it may be assumed to have increased at least 10 per cent, making it in 1895 about 21,000 kilograms.

7. *Netherlands.*—The answer that came to the Bureau of the Mint's interrogatory regarding the industrial consumption of silver in the Netherlands in 1895 was as follows: "At the various guaranty bureaus 752 kilograms of new gold articles and 10,476 kilograms of new silver articles were presented for registration and stamping. The quality of these articles varied, of course. The actual value thereof may be estimated at $302,304 of gold articles and $170,428 of silver articles. What amount of new and old gold and silver was used in the industrial arts can not be stated."

The data here furnished are not sufficient to base an estimate of such consumption on in 1895, and the Bureau adopts that of Professor Lexis, viz, 12,000 kilograms net.

8. *Portugal.*—It also adopts Professor Lexis's estimate of the industrial consumption of silver in Portugal in 1895, viz, 5,000 kilograms net. The 1894 returns to this Bureau placed it at 5,740 kilograms, old material included.

9. *Russia.*—Russia's industrial employment of silver in 1895 is reported to the Bureau of the Mint at about 145,823 kilograms, 25 per cent of which may be estimated to have been old material, making the net industrial consumption about 109,368 kilograms, which amount is the same as that estimated by Professor Lexis.

10. *Sweden.*—Respecting the industrial consumption of silver in Sweden in 1895, the Bureau of the Mint has received the following answer to its interrogatory on that point: "The weight of the silver employed in Sweden in 1895 in the manufacture of silver articles may be estimated at 2,150 kilograms." The weight of the fine silver employed in silvering, plating, etc., is unknown. The total net consumption of silver in Sweden in 1895 in the industrial arts is placed by Lexis at 3,000

kilograms, which is probably very near the actual amount, and is therefore adopted here.

11. *Switzerland.*—According to the Austrian Tabellen zur Währungs-Statistik, Sechster Abschnitt, Vienna, 1896, page 134, the industrial consumption of silver in Switzerland in 1894 was 3,000,000 francs, or about $600,000, which represents, at the average price of silver in 1895, viz, $21.029 per kilogram, about 28,500 kilograms. Lexis, however, estimates it at 25,000 kilograms net, while it was estimated by Soetbeer for the period 1871–1880 at 24,000 kilograms, and he calculated it at the same figure in 1885. Haupt estimated it in 1892 at 50,000 kilograms. The information received by the Bureau of the Mint is that the total consumption of gold and silver in Switzerland represents a value of 40,000,000 francs, divided between the two metals in the proportion of 37 to 3. It therefore places the net industrial consumption of silver in Switzerland in 1894 and 1895 at about 28,500 kilograms, in round numbers, at which figure this Bureau also places it.

12. *Other countries.*—In 1885 Dr. Soetbeer estimated the industrial consumption of silver in countries other than those mentioned above at 40,000 kilograms. It may be safely assumed that it has since increased at least 5,000 kilograms, and it is therefore estimated in 1895 at a minimum of 45,000 kilograms net.

Adding the figures given above for the various countries, the world's industrial employment of silver in 1895 is found to be 995,863 kilograms, of the coining value of $41,388,052, and the commercial value, at the average price of silver in 1895 of $0.65806 per fine ounce, or $21.156 per kilogram, of $21,068,478.

THE WORLD'S INDUSTRIAL CONSUMPTION OF SILVER IN 1895.

Country.	Weight.	Coining value.	Commercial value.
	Kilograms.		
Austria-Hungary	58,000	$2,410,480	$1,227,048
Belgium	20,000	831,200	423,120
England	140,000	5,818,400	2,961,840
France	141,750	5,891,130	2,998,863
Germany	150,000	6,234,000	3,173,400
Italy	21,000	872,760	444,276
Netherlands	12,000	498,720	253,872
Portugal	5,000	207,800	105,780
Russia	109,368	4,545,334	2,313,790
Sweden	3,000	124,680	63,468
Switzerland	28,500	1,184,460	602,946
United States	262,245	10,898,888	5,548,055
Other countries	45,000	1,870,200	952,020
Total	995,863	41,388,052	21,068,478

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REPORTS OF THE SPECIAL AGENTS OF THE BUREAU OF THE MINT ON THE PRODUCTION OF THE PRECIOUS METALS IN 1895 IN THE SEVERAL STATES AND TERRITORIES.

I

ALASKA.

By CHARLES G. YALE.

While for some years past the bullion yield of Alaska has been about the same from year to year, 1895 shows a very material increase in gold product over the figures of 1894. This is due, not only to increased production of the older mines, but to the opening of new fields of placer and quartz mining. In quartz operations more capital has of late been invested, and several large properties are now being opened, which in another year will have reached a producing stage. The new placer fields at Turnagain Arm, Cooks Inlet, Kachamak Bay, were discovered late in the fall of 1894. They are on the south side of Turnagain Arm, on creeks heading in the Kenai Peninsula. About 300 miners went there in 1895, but fully half left without doing any mining. The richer discoveries were not made until late in the season, and few got their claims opened in time to do much work. In the spring of 1896 a large number of miners left California, Oregon, and Washington for these new placers, and it is thought as many went there as were destined for the Yukon River district.

The bullion yield of Alaska in 1895 was as follows:

Gold	$2,328,419.43
Silver	97,862.53
Total	2,426,281.96

The output of 1894 was—

Gold	$1,282,623.13
Silver	5,716.55
Total	1,288,339.68

For 1895 the yield of the quartz mines on Douglas and Unga islands alone equaled the entire product of the Territory the year before, without counting the other mining fields which have been more fully developed.

While some silver is produced, the main mineral product of Alaska is gold. The discovery of gold has been the influence which has led to the settlement of the country by a white population, and at least four-fifths of this white population are now devoting their attention wholly to the mining business. Each year brings about an increase in the number of miners, who scatter out to the camps in different sections,

some leaving in the fall to return again in the spring and others spending the winter at the posts most contiguous to their mines.

The operations in southeastern Alaska are confined mainly to quartz mining and milling, in which stamp mills, quicksilver plates, concentrators, and chlorination process are used. The ores are not of a free-milling character, although much free gold is caught upon the plates. The mineral reef running along Douglas Island and nearly parallel with the shore line, and only a few hundred feet back, is an immense one, ranging from 50 to 500 feet in width and of an as yet unknown depth. In the Paris and Mexican locations on this reef the workings are now extended down some distance below the level of the sea. Stamps, plates, concentrators, and a large chlorinating plant are all used in connection in the reduction of these ores.

Two miles north of the Doulas Island reef lies another mineral belt, the two running parallel with each other in a southeast and northwest direction. Upon the mainland belt is located the mines in Berners Bay, Silver Bow Basin, Sheep Creek, Sum Dum Bay, and lesser intermediate localities, the mineral belt thus far followed showing up for a distance of 100 miles, from Berners Bay to Sum Dum Bay. The ores in this belt differ in character from the Douglas Island reef, but are worked by the same processes, except that the concentrates are shipped to the Pacific Coast smelters for reduction instead of going through the chlorination process. These ores bear galena, zinc blende, iron, and copper pyrites, some free gold and native silver and gray copper, and ruby and black sulphurets of silver.

During the year 1895, 300 stamps were dropping on Douglas Island and during the summer 125 stamps were dropping on the mainland.

Other outlying districts are also coming into prominence, mainly on Admiralty Island, upon which a new ten-stamp mill is now ready for running, being operated by the Alaska-Willoughby Gold Mining Company. On Unga Island some very extensive and productive quartz operations are being carried on.

In southeastern Alaska, so far, all the placer mining has been done in gravel deposits, which were made auriferous by the wash from quartz veins.

In the beach sands that lie along the foot of the St. Elias Alps, western Alaska, placer mining has been going on for several years, with various failures and successes. These deposits carry black and ruby sand and fine gold, the sands being washed in sluice boxes, which are bottomed with riffles and silver plates. Most of this gold is bright and amalgamates readily, so a large per cent of it is saved. This gold brings at the mint about $18 an ounce. For the year 1895 these ruby-sand diggings yielded $17,574.54 and gave employment to 21 men who were engaged in actual mining.

All mining done in the interior of Alaska, in what is commonly termed the Yukon River country, is in the alluvial gravel deposits in

the beds of creeks that are branches of the main Yukon. The discovery of paying quartz veins is reported, but as yet no development work has been done upon any of them. Placer mining is being carried on by the use of pans, rockers, sluices, and upon a few claims small hydraulics with canvas hose are at work. The gold in the Upper Yukon district, which lies wholly in British territory, is all classed as "fine" gold, and is found along the banks of the large rivers, and evidently its origin lies long distances away. In the Middle Yukon division, lying wholly in Alaska, the placers yield "coarse" gold, ranging in size from a kernel of wheat up to ounce nuggets, the largest nugget ever taken out weighing 30 ounces. In the Lower Yukon division but little prospecting has yet been done.

The placer fields in the Cooks Inlet section, in western Alaska, are yet new and but little information as to their real wealth is known up to present date. Some 300 miners were in the field during the summer of 1895 and 69 wintered there. The gravel deposits yield "coarse" gold very similar in character to the Yukon gold.

The principal silver product of the Territory comes from Sheep Creek district, where a number of mines are being opened and developed.

The placer gold comes mainly from the Yukon River districts, Cooks Inlet, and the ocean beach sands. The most important placer districts are those of the Upper Yukon, or the creeks and other streams emptying into the river. The Forty-mile district embraces Forty-mile, Sixty-mile, and Glacier creeks and their tributaries. In this district some 600 men worked last year in the summer season. The Birch Creek and its tributaries district, also on the Yukon, embraces the mines on Birch Creek. Circle City is the principal point, and there were about 700 men worked in that region during the summer of 1895. Beaver Creek district includes Beaver Creek and another creek farther to the west, where only 10 men were working last year. Koyakuk district embraces the mines on the Koyakuk river, where some 30 men were at work. All these districts are in the Yukon River region.

The rate of wages for miners varies greatly in Alaska, in accordance with the locality. The miners who work for wages in the Yukon region get $10 per day, doubtless the highest wages paid in the United States in mining. Between 1,300 and 1,500 men worked the last year. Many of these, of course, are working for themselves, as is the case in all placer districts. At Cooks Inlet last year some 300 men were at work mining and prospecting. On Admiralty Island the wages are $3.50 per day. On Douglas Island 300 miners get from $2 to $3.50 per day, according to the nature of the work. On Unga Island the average rate is $2.85 per day, though the miners get $3.50 and the mill men $4.50 per day, the average being brought down by the less pay of the laborers. In the Silver Bow Basin and Sheep Creek districts the average pay is $3 per day. At Juneau they get $3.50 per day in quartz mining.

It is very difficult indeed to ascertain with any exactness the number of men employed in mining in Alaska. Actual returns, in reply to inquiries from the Mint Bureau, show the number to be 2,277, which includes those at Admiralty Island, Douglas Island, Unga Island, Juneau, Salmon Creek, Sheep Creek, Silver Bow Basin, Sum Dum, Wrangel, Lituya, Yakutal, Cooks Inlet, and the Yukon region. However, Mr. G. B. Swinehart, editor of the Alaska Mining Record, estimates that in southeastern Alaska, where most of the operations are carried on, about 3,000 miners are at work. As in most regions, work is only carried on in summer. The number of men varies greatly with the season. In the placer camps the population is essentially nomadic. Hundreds of men, too, are not actually engaged in mining, but prospecting the streams in search of new diggings, or the hills, hunting for quartz. For these reasons, too, it is impossible to ascertain with any degree of exactness the amount of yield of the placer fields. The miners when they leave in the fall bring their gold with them, not only to San Francisco, but to Victoria, Tacoma, Seattle, Portland, etc., so that no accurate record can be obtained. The amount carried by the transportation companies and that produced by the large quartz-mining companies is readily ascertained, but no one can tell the amount carried out of the country by individuals who have been working their own claims in the placer districts. More than double the number of men in Alaska in 1895 will be on the placer fields in 1896, as early in the spring of this year numerous expeditions left San Francisco and other Pacific Coast cities on the way to Alaska. The steamer travel also began a month or two earlier in 1896 than is usual on the Alaska route, and all the steamers were crowded with miners on the way to the Yukon or Cooks Inlet placer mines. It is proper to note that Mr. G. B. Swinehart, of Juneau, greatly aided the superintendent of the mint at San Francisco in obtaining returns from the Alaska mines for 1895.

PRODUCT OF THE MINES OF ALASKA.

RECAPITULATION.

District.	Gold.	Silver.	Total.
Beach sands, western Alaska	$17,954.54	.....	$17,954.54
Cooks Inlet placers	50,000.00	.....	50,000.00
Douglas, Unga, and Admiralty islands	1,270,593.76	.....	1,270,593.76
Juneau	189,813.08	.....	189,813.08
Sheep Creek district	40,743.05	$97,862.53	138,605.58
Silver Bow Basin	45,325.00	.....	45,325.00
Sitka and Sum Dum	490.00	.....	490.00
Wrangel placers	500.00	.....	500.00
Windfall Creek	4,000.00	.....	4,000.00
Yukon placers	709,000.00	.....	709,000.00
Total	2,328,419.43	97,862.53	2,426,281.96

II

ARIZONA.

By JOHN F. BLANDY,
Mining Engineer, Prescott, Ariz.

In making up the statistics of the precious metals from Arizona for the year 1895, I am surprised and sorry to have to report a decrease in both metals from the previous year. The falling off in silver was to be expected, but the activity in gold mining which has prevailed during the year led me to expect different results. In comparing the returns for the year 1894, it will be seen that all the counties, except Gila and Yavapai, show a decrease, but in Yavapai the increase has been 31⅛ per cent over the previous year. In this county there have been some new mills started, but the old ones of the large mines have run almost continuously for the whole year. Many new small mines have been started, and some of them are putting up mills, so that we may look for much better returns for 1896.

In Mohave County the decrease has been due to the stopping of the large silver mine at the White Hills, the ores of which also carry a good amount of gold. A large gold mill is to be erected in that county, but will hardly do much this year.

In Yuma County the closing out of the Harqua-Hala mine reduced the return from that county about one-half. A 20-stamp mill is now being built near Yuma and will soon be running. The mine is reported as very rich.

Pinal County has had two idle mills for nearly the whole year, where heretofore the yield has been large. A new 20-stamp mill will start shortly.

The mines at Tombstone, Cochise County, have entirely closed, but there has been quite an excitement during the past two months over new gold discoveries a few miles from that district.

At Oro Blanco, in Pima County, a gold mill has lately been started, the ore being treated by the "cyanide process" with good results.

As a general thing, the activity in gold mining has been unabated throughout the year and shows no diminution at the present time. The work of development is carried on in a better manner than heretofore and works of a more permanent character are being built. Many new and valuable discoveries have been made, but the work upon them has not been sufficiently advanced to show in the returns of the year 1895.

The "cyanide process" has been successfully introduced at five places, all but one being upon "old tailing" piles, viz, at Congress, Harqua-Hala, Tombstone, and the Old Vulture mines. At Oro Blanco they have introduced the plan to work the ores from the starting of the mine.

It has been impossible to arrive at any approximate account of the number of miners at work in the Territory, since so many men work on their own account as "chloriders," taking their ores for treatment to custom mills. The wages of miners are $3 to $3.50 per day, and laborers vary from $1.50 to $2.50 in different localities. At present there are not many idle men, except those who are so from choice.

PRODUCTION OF GOLD AND SILVER IN ARIZONA FOR 1895.

Counties.	Gold bullion	Gold in ores.	Total gold.	Silver bullion.	Silver in ores.	Total silver.
				Ounces.	*Ounces.*	*Ounces.*
Cochise	$17,342	$36,331	$53,673	800	152,787	153,587
Gila	13,467	.....	13,467	.....	.....	.....
Graham	2,061	.....	2,061	.....	747	747
Maricopa	50,779	26,000	76,779	.....	.....	.....
Mohave	11,105	72 491	83,596	108,083	372,192	480,275
Pima	96,483	28,000	124,483	5,750	166,500	172,250
Pinal	85,000	.....	85,000	.....	32,000	32,000
Yavapai	360,776	898,055	1,258,831	.....	322,033	322,033
Yuma	172,528	1,200	173,728	.....	9,301	9,301
Total	809,541	1,062,077	1,871,618	114,633	1,055,560	1,170,193

	Pounds.
Lead reported	1,790,149
Copper reported	29,990,046

III

CALIFORNIA.

By CHARLES G. YALE.

The product of precious metals in the State of California for the calendar year 1895, as reported by the superintendent of the mint at San Francisco, is as follows:

Gold	$15,334,317.69
Silver	599,789.70
Total	15,934,107.39

In 1894 the product of the State was:

Gold	$13,863,281.89
Silver	297,331.55
Total	14,160,613.44

A comparison of these figures show that the gold yield of 1895 increased over that of 1894 by $1,471,035.80, and the silver product increased $302,458.15, a total increase of precious metals in California over the previous year of $1,773,493.95.

The gold product of the State is shown by these reports to be gradually enlarging each year. The increase of gold in 1894 over 1893 was $1,324,502.29, which, with the increase of 1895 of $1,471,035.80, shows that within two years there has been an addition to the annual product of $2,795,538.09 in gold. The increase in silver product this year is also material, this coming mainly from the more southern counties of the state, though more or less is taken out with the gold in all the bullion-producing counties.

Those familiar with the conditions affecting mining operations in California predict a further augmentation of the gold product for some years to come. This opinion is based on the fact that in late years more capital has been invested in quartz and gravel mines than had previously been the case for a long time. Moreover, it has come to be recognized that deep mining in the gold leads will pay handsomely where sufficient capital is invested for proper development and plant, and many mines which were abandoned at comparatively shallow depths are being reopened and sunk by organized companies with means to do the work without having to depend upon the daily output of the mine itself. When properly and thoroughly opened, the mines as a general rule repay all the outlay. The success of some few companies in this direction has been such as to induce many others

to adopt the same plan. Numerous instances might be cited where mining companies, especially in the Mother Lode regions, are sinking shafts 1,500 to 2,000 feet deep direct, without stopping to drift or crosscut until the desired depth is attained. This feature is a comparatively new one in California, where the shaft sinking, after a few hundred feet, has usually been gradual, and the product of the mine itself depended upon to furnish means for deeper working. This deep sinking direct involves also large expenditure for hoisting and pumping machinery, for which reason companies only with abundant ready capital can undertake such operations. Many of these ventures will not reach a productive stage for one or two years, nor are they expected to, but when those now being prosecuted reach this point the gold yield of the State should naturally be materially augmented.

It may be stated also, in further explanation of the gradual increase in gold production of California, that a great many mines have been started again in operation after a long period of idleness, through coming into possession of men or companies financially able to bring them to a producing stage. In numerous instances where water became troublesome or the ore of too low grade to pay well under the conditions existing ten to twenty years ago, the mines were left practically abandoned and idle, only work enough being done to hold them. There are still hundreds and hundreds of such mines, which are gradually being rehabilitated by the infusion of capital in the mining counties. Moreover, the demand for gold properties, which has become manifest within the past two years, has encouraged many to open and develop small claims upon which little work had previously been done. Many of these have become producers on the resumption of operations.

The prevailing conditions have, moreover, given marked impetus to prospecting throughout the gold regions of the State, which has resulted in the discovery of a great many new claims, many of which are being opened and developed, and some of which have become producers on a moderate scale. Another feature to be considered is that certain agricultural or horticultural operations having become unprofitable, some men formerly engaged in those operations have turned their attention to prospecting or working mining ground either overlooked or unconsidered, and others have regularly engaged in mining as a business. The merchants and business men of the cities and towns have also engaged in mining within the past two years to a larger extent than formerly, and have been willing to assist miners and prospectors in finding or developing claims. Investments are being made by small companies, the members of which pay for their stock in monthly installments extending over a period of one or two years, the money collected being spent almost entirely in purchase, development, and equipment of the claims, and none of the officers, aside from the acting superintendent, being paid salaries. The mining is thus carried on in an economical manner, and men of small means are afforded an

opportunity of becoming interested in mining operations. Of course the organization of such companies involves the purchase of mining properties and the employment of men, which is a good thing for the mining regions and the mining industry.

Those who have claims, but no means to open them, are thus enabled to sell outright or get the financial assistance necessary. In the case of large mines there is now no difficulty whatever in procuring capital, either for purchase, equipment, or development, the demand for such being greater than the supply.

The hydraulic mines in the drainage basin of the Sacramento and San Joaquin rivers are slowly but gradually resuming work under the operations of the Federal law placing them under the supervision of a commission of engineers and permitting them to operate when the necessary impounding dams for restraining the débris are constructed to the satisfaction of the commission. Since the establishment of this Débris Commission a few years ago they have granted license to mine to some hydraulic mines in the district under their jurisdiction. In each case the mine and works have been examined by the Commission or its agents, the character of the impounding works have been specified, and the mine only permitted to operate while the dam or works are efficient for restraining the débris from entering the streams, when it might eventually find its way to navigable waters. Under this beneficent law this class of mines may be operated without doing any damage to the rivers or the lands along their banks and without being involved in the endless and bitter litigation which formerly resulted. The output of these mines has materially increased the gold product of the State and their renewal of operations has helped to rehabilitate sections of the State which were partially deserted and impoverished when the mines were closed down by injunction of the courts. Naturally, under the conditions requiring the work to be done behind débris dams, the output of the mines is restricted as compared with that when the amount of gravel washed was only limited by the water supply now, since the gravel must be washed into reservoirs and the muddy water there settled until it flows out practically clear of débris. These conditions do not apply in the counties the streams of which empty into the nonnavigable Klamath River and thence to the ocean, for there the hydraulic mines are operated without any restriction of any kind. As a result, the gravel mining regions of Siskiyou and Trinity counties are attracting capital and their annual yield is gradually increasing.

Altogether, 1895 has been the most prosperous year in the mining regions that California has experienced for twenty years, and much encouragement is felt for the future, in view of the many large operations now under way and the development of properties throughout the older mining counties and particularly along the line of the Mother Lode. There is great activity in all the camps. It is noteworthy, also,

that in the more southern counties of the State, where mining has been inactive for a long time, some large operations are being conducted and considerable capital has been invested. Prospecting and development work are going on all over the counties in that direction, particularly in what is known as the "desert" region, where some very promising mines have been found.

In 1894 the five counties of the State which produced over $1,000,000 were, in the relation of their bullion product, in the following order: Calaveras, Placer, Nevada, Amador, and Trinity. For 1895 the returns from these counties place them in this order: Nevada, Calaveras, Placer, Amador, and Trinity. It will be noted that Nevada County takes first place from Calaveras, which, coming second, pushes Placer County from second into third place. In 1894 Calaveras County produced over $2,000,000, but in 1895 no county reached those figures. As to the increase or decrease of product in each county as compared with the previous years, this may be learned from the following paragraphs referring to these features in the counties for 1895.

Amador County shows an increased total yield of only $60,821.59 over 1894. There are many large operations now being conducted in this county on the Mother Lode, which in time will greatly augment the annual yield.

It is in this county that the success of very deep mining has been most marked, and the result of operations in the Kennedy, the largest producer in the county, has induced others to sink deeper upon many old mines. The silver in this county was obtained with the gold from mines at Amador City and Sutter Creek.

Butte County, which produced $473,672.65 in 1894, shows a yield for 1895 of $706,196.38, an increase for the year of $232,523.73. In this county are many producing mines of both quartz and auriferous gravel. The largest producers among the quartz mines are the Gold Bank, Spring Valley Quartz, Willard, Golden Summit, and Banner; and among the gravel mines the Spring Valley placer is the largest. There are a great many small operations going on in this county, particularly in gravel mining. The silver product was obtained in the gold mining operations at Forbestown.

Calaveras County, which was the only county in California which exceeded the $2,000,000 mark in 1894 and was the leading gold producer, with a record of $2,124,548.47 for the year, makes returns for 1895 of $1,717,993.14, a decrease of product for the year of $406,555.33. This falling off is largely due to a temporary cessation of operations of the Utica Mining Company, caused by a fire in the mine. This mine is the largest producer in the county and, indeed, the State, so that its stoppage of work for a time naturally affected the bullion product of the county.

The very successful operations of this company have resulted in a great many other mines being opened and developed around Angels

and in most other parts of the county. There is great activity in all the camps, and prospecting and development work are going on in all directions. Many old mines which have laid idle for years, notably the Gwin, formerly a large producer, are being reopened.

The production of gold in Del Norte County was practically the same as in the previous year, all coming from small operations in the vicinity of Gasquet.

Eldorado County shows a marked increase in product of $333,485.32 from the returns of 1894, which were $367,063.67, as compared with the $700,548.99 of 1895. The increase was almost as much as the entire product in the previous year. The leading producers among large operations are the Idlewild, Big Canyon, Church, Gentle Annie, Monarch, Linden, Franklin, Zantcraft, and Grand Victory. Most of these mines increased their product for the year, and many have reached a producing stage. There are a great many small but profitable operations going on in most of the camps of the county, and the renewal of operations and increased activity in the mining districts have helped swell the total product materially. There are large numbers of individual miners and Chinese in this county, who add their share to the total. The principal producing sections are at Eldorado, Georgetown, Grizzly Flat, Greenwood, Nashville, Placerville, and Shingle Springs.

Fresno County shows an increase of $39,047 in its 1895 product over that of the previous year, the total being $47,249. This is entirely from small mining operations at Auberry, Dunlap, Letcher, Pine Ridge, and Pellasky.

In Humboldt County the gold product in 1894 was $41,326.10, and in 1895 it is $92,635.20, an increase for the year of $51,309.10. There are no large mining operations in this county, the product coming from those who sell their gold dust at Arcata, China Flat, Klamath, Orick, Orleans, and Weitchpec. There is considerable black-sand mining done on the ocean beaches in this county, though some of the largest of this class of mines were not worked in 1895.

Inyo County produced $92,142.28 in gold in 1895, and $188,329.23 in silver, a total of $280,471.51, which, compared with the figures of the previous year, show an increase in gold yield of $39,503.37 and an increase in silver of $104,689.23, a total increase of $144,192.60. The silver comes from mines at Cerro Gordo, Darwin, Keeler, and Modock, and the gold from Big Pine, Bishop, Cerro Gordo, Independence, and Lone Pine. The largest silver producers are the Sorba, Newton, Lucky Jim, Christmas Gift, Union, and Minietta.

Kern County is one of the few counties showing a reduction of product from the previous year, when the total returns were $350,406.91, as compared with $277,497.59 in 1895, a decrease of $72,909.32. The desert dry diggings at Goler, Red Rock, and Summit gave much smaller returns than in 1894; in fact, the returns from most of the camps were less in number and amount. A great deal of prospecting and developing is,

however, going on, especially in the mountain regions east of Tehachapi Pass, where some new districts are being opened, and considerable activity is manifest in several parts of the county. The silver product of the county is all from the operations of a company in Amalie district. The product of the gold mines at White River is credited to this county, although the mines are on the borders of Tulare and the post-office is in the latter county, but most of the mines themselves are understood to be in Kern.

The product of Lassen County shows a decrease of about $10,000. The entire output of this county comes from the few mines at Hayden Hill.

Los Angeles shows a decrease of product amounting to $11,170, the total product being only $23,330, as compared with $34,500 in 1894.

There are only small mines in this county, most of them being at Acton, Gormans, Newhall, and Pomona.

Madera County gives returns for 1895 of $162,323.74 in gold, as compared with $107,971.60 in 1894, a gain of $54,352.14. There are no large companies operating in this county, the gold product being made up from small operations at Coarse Gold Gulch, Fine Gold Gulch, Ahwahnee, Fresno Flats, Grub Gulch, Hildreth, O'Neals, Starrville, and North Fork.

The total product of Mariposa County in 1895 was $216,629.46, as compared with $153,746.26 in 1894, a gain of $62,883.20. After a very long period of idleness many of the old mines of the county have been reopened and are being worked, and most of the camps are now the scenes of great activity in mining operations. The purchase of a group of mines at Coulterville by a company of Boston and Montana capitalists and their extensive operations in connection with development and plant again attracted attention to the mineral resources of the county and led to more thorough prospecting and a demand for mines. Since these operations commenced numerous other companies have acquired mining interests in the county and are developing their mines. The Merced Mining Company, which is referred to, although employing 200 men at $3 per day, did not reach a producing stage in 1895, all the work being directed toward opening the mines and arranging the plant. Mining activity is most apparent at Coulterville, Hornitos, Mariposa, and Whitlocks, though scattered throughout the county many men are prospecting and opening claims.

Merced County makes the small production of $1,500 from small claims at Merced Falls, though this is about double the returns of the previous year.

Mono County gives returns from its gold mines for 1895 of $552,690.54, and of silver $84,910.37, a total of $637,600.91. The gold product in 1894 was $358,824.46 and the silver $11,549.12, a total of $370,373.58. A comparison of these figures shows an increase of gold over the previous year of $193,866.08 and of silver $73,361.25, a total increase

of $267,227.33. The main increase in this county comes from the gold obtained from old tailings at Bodie, which are being worked over by the cyanide process, though some gain has also been made through the ncreased product of mines at Bodie and Lundy.

Nevada, which held the first place for many years as the leading gold-producing county in the State, and which dropped to third place in 1894, being exceeded by Calaveras and Placer, again assumes the first position in its returns of 1895. Its gold product for 1895 is $1,789,815.66 and silver $400, a total of $1,790,215.66. This is $40,415.65 less than the total product of the county in 1894, notwithstanding which, from the fact that Calaveras and Placer counties show even much greater reductions of product, Nevada County exceeds them and takes first place. However, there seems to be a gradual reduction of annual gold yield in this county. In 1893 the total product was $2,068,432.49; in 1894 it was $1,830,630.31, and in 1895 $1,790,215.66. The large mines around Grass Valley do not appear to be yielding as much as formerly, and in different parts of the county there are numerous mines which are idle; The introduction of electricity for power at Grass Valley and Nevada City is expected to cause a number of mines to be worked upon which little or nothing is now being done.

Orange County gives a nominal yield from a claim or two at Santa Ana.

Placer County, which gave returns of $1,851,878.79 in 1894, and took second place among the bullion-producing counties, drops again to third place in 1895, with a total yield of $1,604,907.32, which amount is exceeded by both Nevada and Calaveras counties. The decrease in product from that of the previous year is $246,971.47. Some of the larger drift mines show a lessened yield, and returns are smaller from operations at Iowa Hill, Michigan Bluff, and some other gravel-mining sections of the county.

Plumas County gives returns in 1895 of $603,222.57, as compared with $499,358.83 in 1894, a gain of $103,863.74. The increase was made up principally from larger product of mines at Crescent Mills, Genesee, Greenville, Granite Basin, La Porte, Prattville, and Taylorsville.

Riverside County, which in 1894 only gave returns of $93,322.50, makes a product in 1895 of $287,656, of which $2,550 is silver, an increase of $194,333.50. This is due entirely to the enlarged product of the mines at Perris and Banning. The two large mines at Perris—the Good Hope and Santa Rosa—gave good returns. The Briggs, Santa Fe, Ophir, Alice, Menifee, and Hancock group all added their yield. Had it not been for litigation in the camp the product would doubtless have been even larger. The Golden Chariot, Indian Queen, and Hancock group companies will all put up mills this summer. At Banning the Desert Queen and Lost Horse are the largest producers. A great deal of prospecting work is now being done in the desert portions of this county.

Sacramento County gives returns of gold for 1895 amounting to $145,872.75, which is $75,546.75 more than was produced in 1894. It is entirely from placer mines around Folsom and Michigan Bar, where a number of whites and Chinese are employed in small individual operations.

San Bernardino County produced in 1895 the sum of $131,360 in gold and $219,410.30 in silver; total, $350,770.30. The increase in gold over returns of 1894 is nominal, but that of silver is $71,167.41, a total of $72,107.63 increase over the yield of the previous year.

Most of the silver in this county comes from mines at Calico, the largest silver-mining camp in the State, but there is some silver produced also at Daggett and Ivanpah. The principal producing mines at Calico are those of the Silver King Company, though some others are yielding also; but the majority of the mines in the camp are idle, owing to low value of silver. None of the Waterloo Company's mines or mills were operated last year. About 90 men are working in the silver mines in the camp. From Daggett several hundred tons of the ore have been shipped to England for treatment. Most of the gold in the county comes from mines which send their bullion to Needles, San Bernardino, Vanderbilt, and Victor.

San Diego County produced in 1895 the sum of $344,907.57, in which is included $600 in silver, as compared with $266,598.33 in 1894, a gain of $78,309.24. Hedges is now the principal producing camp, where the Golden Cross mine turns out about two-thirds of the entire yield of the county. The other main producing points are Banner, Julian, and Ogilby.

The desert regions of this county, especially down along the Colorado River portion, having proved very productive, are being thoroughly prospected. Considerable capital has lately been put in certain of the districts in that portion of the county and a number of properties of merit are being opened. Milling facilities are being increased, so a large yield may be expected in 1896.

San Luis Obispo has produced $3,000 in 1895 from the small mines at La Panza, which is more than double the yield of the previous year.

Santa Barbara County, which made no returns in 1894, shows a yield of $4,000 in 1895 from the small black-sand mines on the ocean beach near Lompoc.

The yield of gold in Shasta County in 1895 was $781,696.32 and of silver $28,417.20, a total of $810,113.52. As compared with the returns of 1894, these figures show an increase in gold of $164,259.64 and of silver $23,384.89, the total increase of the bullion product for 1895 over 1894 being $187,644.53. The largest producers in the county are the Texas Consolidated at Hart and the Uncle Sam mine of the Sierra Butte Company at Kennett. Some of the mines around French Gulch did not do so well as in former years, but this is more than made up by other producers at that and other points. At Middle Creek, Harrison

Gulch, and Iago are some good producers, but the largest amount comes from Hart, Kennett, and French Gulch.

The Mountain Mines, Limited, an English corporation, which has purchased the Iron Mountain mines, is doing an immense amount of development and construction work, and employed part of 1895 about 1,200 men in working the mine and building a railway and smelters. The Iron Mountain is a copper mine, containing a small quantity of both gold and silver, but such large quantities of ore will be worked that the product of the precious metals will be large. Since the railroad was completed from the mine to the smelter at Keswick they have been employing 500 men at average wages of about $1.50 per day. The starting of these smelters has been a strong stimulant to both prospecting and development in this county, as ore may now be worked without the expense of distant shipment. The ores of many mines in the county are more or less rebellious in their nature and had to be shipped to smelters for reduction. Many mines could not stand this expense and pay a profit, but with smelters near at hand they will now be worked. A much larger product may be confidently expected from this county in the future.

Sierra County shows a yield in 1895 of $694,576.63, all, with the exception of $106.96, being gold. Compared with the total product of 1894 this shows an increase of $89,855.09 for the year. The mines at Downieville, Brandy City, Gibsonville, Gold Lake, Forest City, La Porte, Scales, and Quincy all did well. A great deal of drift mining is carried on in this county, and quartz and hydraulic mining as well.

Siskiyou County, which made a gold product of $760,781.83 in 1894, gives returns for 1895 of $950,183.73, an increase of yield for the year amounting to $189,401.90. Most of this money is from gravel mines, which are found all over the county, and from surface mines and bars all along the many rivers and creeks. The Klamath River runs through this county, and along its course are numerous mines being actively operated. This class of mining is very attractive to the Chinese, of whom there are probably a larger number engaged in mining in Siskiyou than in any other county in the State. There are some quartz mines, but these are far outnumbered by the class mentioned. The largest producing quartz mine is the Black Bear. Among the larger producers generally are the Montezuma and A B C, at Callahans; the Summerville, at Cecilville; the Bentz Bar and Pacific, at Gottville; the Lee Wah Company, Owens and Sell Drift, and Pinery, at Fort Jones; the Grider and Wingate Hill, at Happy Camp; the Barton and Lichen and China Lem, at Oak Bar; the Eastlick Bros., Deming, Wright, and Fletcher, at Oro Fino; The Golden Ball, Golden and Evelith, and Humpback, at Sawyers Bar; the Fort Goff, at Seiad; the Junction Bar and Quartz Hill, at Scott River. There is a larger number of small producing claims in this county than in any other in the State, and their output makes up a very respectable aggregate

sum. It is to be noted that there are no restrictions whatever upon hydraulic mining in this county, as there are in the counties the streams of which drain into the Sacramento and San Joaquin rivers. The rivers, creeks, and streams in Siskiyou drain into the Klamath River, an unnavigable stream, so that no impounding works are necessary at the hydraulic mines. They can therefore wash as much gravel as their water supply will permit. There are large tracts of auriferous gravel in this county which are still untouched, but which will be utilized when the necessary capital is invested to construct ditch and reservoir systems.

Stanislaus County produced $26,481.50 in gold in 1895, which is practically the same output as the year previous, all from surface mines at Knights Ferry and La Grange.

Trinity, which is one of the five counties of the State which usually produces over a million dollars a year, shows a yield of $1,168,002.41 for 1895, of which only $1,257.28 is silver. The yield in 1894 was $1,012,990.84, so that the increase of product for the year is $155,011.57. This increase is due to more productive operations in different portions of the county. Both quartz and gravel mining are carried on in Trinity, the latter class of mining, however, predominating. The largest producing quartz mine is the Brown Bear, at Deadwood. There are several large producing gravel mines, and some considerable capital has recently been put into extensive ditch systems for increased water supply.

The conditions as to hydraulic mining in Trinity are the same as those mentioned previously with relation to Siskiyou, there being no restrictions upon the industry, as the various streams into which débris is dumped finally empty into the Klamath River.

There are numerous small gravel mines being operated along most of the streams in the county, the aggregate output from which amounts to a considerable sum. In this county, as elsewhere where there is surface or gravel mining, there are numerous Chinese miners at work.

Tulare County, which did not appear in the statistical tables of bullion production in 1894, shows a yield for 1895 of $16,320. A small amount is from claims about Auckland, but most of the gold is from newly opened placers at Rattlesnake Creek, Yokohol, and Mill Creek.

The yield of Tuolumne County for 1895 was $667,066.77, all of which is gold except the nominal sum of $312.62. The increase in this county over the record of the previous year amounts to $118,546.55. Some of the larger mines were especially productive during 1895, which accounts for the increase almost entirely.

Yuba County produced in gold in 1895 the sum of $111,482.34, which is $4,002.14 more than the yield of 1894. This gold is from the surface mines at Brownsville, Bullards Bar, Camptonville, Smartsville, and Strawberry Valley.

The number of men employed in the gold and silver mines of Cali

fornia is shown in the following table, as per returns to the mint at San Francisco:

County.	Number of men.	County.	Number of men.
Amador	750	Plumas	575
Butte	650	Riverside	231
Calaveras	1,150	Sacramento	230
Del Norte	55	San Bernardino	300
Eldorado	750	San Diego	465
Fresno	90	San Luis Obispo	16
Humboldt	140	Santa Barbara	15
Inyo	232	Shasta	1,033
Kern	350	Sierra	600
Lassen	40	Siskiyou	1,806
Los Angeles	94	Stanislaus	60
Madera	205	Trinity	875
Mariposa	658	Tulare	60
Merced	10	Tuolumne	765
Mono	315	Yuba	164
Nevada	1,475	Total	15,828
Orange	8		
Placer	1,526		

The rate of wages paid varies with the section of the State and the class of work about the mines in which the men are engaged. In some parts of Amador County the average rate of wages is $2.75; in others, $2.50 and even $2, while in some mines $3 per day is paid. The average where the largest number of men are employed appears to be $2.75, the rate of the laborers below the miners reducing the average wages. A great many men are working for $2.50. In Butte County $2.50 and $2.75 seem to be common wages, but in some instances $3 is paid. In Calaveras County the average rate appears to be $2.50 and $2.75 per day. The Utica Mining Company, which employs more miners on its properties than any other company in the State, has 500 men at work at an average rate of $2.75 per day. In Del Norte County, where it is all surface work, $2 is paid. In Eldorado County the average seems to be $2.50 and $2.75, and in some cases the average is $3. In some parts of Fresno men are working for $1.50 and in others $2.50 per day. In Humboldt County, where it is all surface work, the men get $1.50 and $2.50 per day and $35 per month and board. In Inyo County the rate runs $2.50, $2.75, and $3. In Kern it is $2, $2.50, and $2.75. In Lassen County the returns show $2.50 per day. In Los Angeles the rate is $2.50. In Madera it runs from $2 to $3, according to class of work. In Mariposa it is $2, $2.50, and $3, the largest mining company in the county, the Merced Gold Mining Company, paying $3 per day to 200 men. In Mono County the highest rate of wages is paid, $4 per day being the rate at Bodie and Lundy, though in some places $3 is the average. In Nevada County the average is $2.50 and $3, though in some few places $2 and $2.50 are paid. Placer County varies

greatly. The Chinese get $1.25; some white men $2, $2.50, $2.75, and $3. In Plumas County the rate is $1.25 and $1.50 for Chinese and $2, $2.25, and $2.50 for whites, with some few instances of an average of $3. Riverside County mines pay $2, $2.50, and $3, and in some instances $3.50. In the surface mines in Sacramento County the average rate appears to be $1.75 and $2. In San Bernardino they pay $3 and $3.50 per day. In San Diego County there is a rate of from $2.50 to $3 per day. In San Luis Obispo County they have men at work for $1.50 and $2 per day. In Shasta they pay $1.50, $2, $2.50, and $2.75. One large mine with 90 men at work pays an average of $2.65, and one with 500 men pays an average of $1.50, but of this latter number only 200 are actually mining, the others being laborers on the railroad and about the smelters. In Sierra County there are men working for $1.50, $2, $2.50, and $3 per day, the latter rate being paid in the drift and quartz mines. In Siskiyou County the Chinese working for wages get $1, $1.25, and $1.50, and others get $2 and $2.50 per day and $35 and $40 per month and board. There were no returns of $3 per day from this county. In Trinity County they pay men $1.50, $1.75, $2, and $2.50 on the average. Tulare County has an average rate of from $2 to $2.50. In Tuolumne it runs from $2, $2.50, and $2.75 to $3. Yuba County pays $1.50, $2, $2.50, and up to $3 in a few instances.

The general rate of wages for experienced miners under ground in the quartz and drift mines appears to be $3 per day throughout the State, except in Mono County, where it is $4. Surface men get $2.50 on the average and laborers about $2 The Chinese get from $1 per day up to $1.75, the average rate being $1.25 generally. In some counties men are paid, with board, $35, $40, or $45 per month. It has been found impossible to segregate the number of Chinese from the white miners in collecting this data, though the presence of the former in many instances brings down the average rate of wages materially, they being paid much less than white men.

BULLION PRODUCTION OF MINES IN CALIFORNIA.

RECAPITULATION.

County.	Gold.	Silver.	Total.
Amador	$1,391,929.40	$1,089.00	$1,393,018.40
Butte	697,260.85	8,935.53	706,196.38
Calaveras	1,717,916.14	77.00	1,717,993.14
Del Norte	8,250.00	.....	8,250.00
Eldorado	700,101.31	447.68	700,548.99
Fresno	47,249.00	.....	47,249.00
Humboldt	92,635.20	.....	92,635.20
Inyo	92,142.28	188,329.23	280,471.51
Kern	231,433.31	46,064.28	277,497.59
Lassen	25,000.00	.....	25,000.00
Los Angeles	23,330.00	.....	23,330.00
Madera	162,323.74	.....	162,323.74
Mariposa	216,622.39	7.07	216,629.46

BULLION PRODUCTION OF MINES IN CALIFORNIA—Continued.

RECAPITULATION—Continued.

County.	Gold.	Silver.	Total.
Merced	$1,500.00	.....	$1,500.00
Mono	552,090.54	$84,910.37	637,000.91
Nevada	1,789,815.66	400.00	1,790,215.66
Orange	144.00	.....	144.00
Placer	1,599,634.79	5,272.53	1,604,907.32
Plumas	602,951.05	271.52	603,222.57
Riverside	285,106.00	2,550.00	287,656.00
Sacramento	145,872.75	.....	145,872.75
San Bernardino	131,360.00	219,410.30	350,770.30
San Diego	344,307.57	600.00	344,907.57
San Luis Obispo	3,000.00	.....	3,000.00
Santa Barbara	4,000.00	.....	4,000.00
Shasta	781,696.32	28,417.20	810,113.52
Sierra	694,469.67	106.96	694,576.63
Siskiyou	950,006.43	177.30	950,183.73
Stanislaus	26,481.50	.....	26,481.50
Trinity	1,166,745.13	1,257.28	1,168,002.41
Tulare	16,320.00	.....	16,320.00
Tuolumne	666,754.15	312.62	667,066.77
Yuba	111,482.34	.....	111,482.34
Unapportioned[1]	53,786.17	11,153.83	64,940.00
Total	15,334,317.69	599,789.70	15,934,107.39

[1] Refers to returns from Denver mint and smelters in Washington of California bullion not possible to aggregate with county totals.

IV

COLORADO.

By W. J. PUCKETT,

Assayer in charge United States Mint, Denver, Colo.

The value of the mineral production of Colorado for 1895 was—

Gold	$15,013,434
Silver (coining value)	31,075,314
Lead	3,047,590
Copper	1,065,900
Total	50,202,238

The increased gold production was principally due to the Cripple Creek district in El Paso County. At this writing (February 1, 1896) there are 205 mines in the district which have shipped ore or have pay ore in sight in quantities sufficient to justify shipment. One hundred properties are equipped with steam hoists and a small number have air drills. Two cyanide, 2 chlorination, and 6 stamp mills treated about 60,000 tons of low-grade Cripple Creek ore during the year. The Omaha and Grant Smelting Company at Denver alone treated over 40,0000 tons from this district, which averaged $76 per ton.

The known mineral belt has been extended 2 miles north and 1 mile south, with a small increase in width. Prospecting is going on over an area of 15 by 10 miles with encouraging results.

The Cripple Creek camp has been largely developed by Colorado capital, Eastern and European money invested not amounting to over 5 per cent.

The population of the district is now over 30,000, with every prospect that this number will be largely increased the coming summer.

Another railway to the camp seems assured, which will make three lines and furnish ample facilities of this character. Surveys for the new road have been completed.

The wages for miners is $3 per day.

The Leadville district materially increased its gold product during the year, and a great amount of development work was done. The camp numbers over 100 shipping mines. An extensive tunnel proposition to thoroughly drain the mines of the district, and thus overcome the vital drawback to economical mining in the Carbonate camp, is being enthusiastically launched by noted capitalists, and will undoubtedly prove a successful solution of the wet-mine difficulty.

Gilpin County has largely increased its milling capacity and new methods were introduced.

The San Juan district, including the counties of San Juan, San Miguel, Ouray, and Hinsdale, has witnessed a flattering mining revival during the year. Much capital has found investment here, and prospectors throng the country.

Boulder and Clear Creek counties were actively engaged during the year.

West Creek, located in the southwestern part of Douglas County and lapping over into El Paso, is a most promising "gold find." The formation is metamorphic granite abounding in fissures. The vein fillings are similar to those of Cripple Creek, with values principally in gold.

The Bare Hills country, lying 5 miles southwest of Cripple Creek district and covering an area of 6 miles square, is the latest gold discovery. Its formation is identical with that of Cripple Creek, and prospecting is being vigorously prosecuted with flattering results.

Following is the production of Colorado, by counties, for 1895, the equivalents employed in calculating values being, gold, $20.67 fine ounce; silver, $1.2929, coining value; lead, 3 cents per pound; copper, 11 cents per pound:

PRODUCTION OF COLORADO FOR 1895, BY COUNTIES.

Name of county.	Gold, value.	Silver, value.	Total value gold and silver.	Lead, value.	Copper, value.	Total value.
Arapahoe	$1,220	$78	$1,296	.....	.....	$1,296
Boulder	413,527	54,034	467,561	$371	$9,020	476,952
Clear Creek	720,776	2,065,666	2,786,442	148,083	6,885	2,941,410
Chaffee	173,355	39,352	212,707	9,245	11,858	233,810
Costilla	142	.....	142	.....	.....	142
Custer	77	117,711	117,788	4,533	639	122,960
Delta	87	1	88	.....	.....	88
Dolores	59,300	490,284	549,584	10,178	10,000	569,762
Eagle	34,867	70,948	105,815	57,412	.....	163,227
El Paso	6,879,137	90,878	6,970,015	.....	.....	6,970,015
Fremont	21	.....	21	.....	.....	21
Garfield	173	1	174	.....	.....	174
Gilpin	1,309,923	252,678	1,562,601	27,374	32,644	1,622,619
Gunnison	41,451	151,692	193,143	6,548	.....	199,691
Hinsdale	274,421	602,218	876,639	110,302	.....	986,941
Huerfano	98	.....	98	.....	.....	98
Jefferson	2,925	21	2,946	.....	.....	2,946
Lake	1,524,363	12,487,284	14,011,647	1,127,417	437,024	15,576,088
La Plata	3,953	131	4,084	.....	.....	4,084
Larimer	362	1	363	.....	.....	363
Mineral	129,181	1,849,924	1,979,105	196,621	.....	2,175,726
Montrose	1,333	14	1,347	.....	.....	1,347
Montezuma	202	.....	202	.....	.....	202
Ouray	154,871	1,972,977	2,127,848	126,388	.....	2,254,236
Park	108,679	61,966	170,665	3,204	458	174,327
Pitkin	1,565	6,775,488	6,777,053	262,063	96	7,039,212
Rio Grande	17,824	4,461	22,285	.....	.....	22,285

PRODUCTION OF COLORADO FOR 1895, BY COUNTIES—Continued.

Name of county.	Gold value.	Silver value.	Total value gold and silver.	Lead value.	Copper value.	Total value.
Routt	$6,691	$114	$6,805	.....	.....	$6,805
Saguache	603	5,231	5,834	$8,081	.....	13,915
San Juan	536,967	930,781	1,467,748	27,567	$299,560	1,794,875
San Juan region	381,506	1,545,204	1,926,710	175,095	116,270	2,218,075
San Miguel	1,569,273	759,562	2,328,835	24,545	23,028	2,376,408
Summit	225,840	342,812	568,652	107,035	165	676,452
County unknown	438,721	403,784	842,505	614,928	118,253	1,575,686
Total	15,013,434	31,075,314	46,088,748	3,047,590	1,065,900	50,202,238

STATEMENT OF BULLION OPERATED ON AT THE UNITED STATES MINT, DENVER, COLO., DURING THE CALENDAR YEAR 1895.

Source.	Gold.	Silver.	Total.
COLORADO—COUNTIES.			
Boulder	$70,381.13	$325.37	$70,706.50
Clear Creek	66,739.04	579.88	67,318.92
Chaffee	98,879.17	1,018.27	99,897.44
Costilla	142.14	.44	142.58
Dolores	278.40	4.30	282.70
Delta	86.71	.93	87.64
El Paso	245,873.96	1,699.33	247,573.29
Eagle	201.19	1.20	202.39
Gilpin	583,627.45	4,562.06	588,189.51
Gunnison	5,767.07	44.47	5,811.54
Garfield	173.44	.59	174.03
Huerfano	97.55	.29	97.84
Jefferson	1,861.33	11.69	1,873.02
Lake	5,852.24	48.50	5,900.74
La Plata	3,829.37	14.26	3,843.63
Larimer	361.62	.63	362.25
Montrose	1,187.90	10.91	1,198.81
Montezuma	202.45	.47	202.92
Ouray	10,993.61	130.08	11,123.69
Park	46,086.05	373.80	46,459.85
Pitkin	184.13	1.05	185.18
Rio Grande	509.88	5.60	515.48
Routt	6,690.69	113.89	6,804.58
Saguache	251.97	3.03	255.00
San Juan	63,260.85	662.58	63,923.43
San Miguel	465,080.61	6,132.30	471,212.91
Summit	70,588.55	663.01	71,251.56
County unknown	536,037.74	6,743.97	542,781.71
B. & C. Smelter	1,278,241.81	588.52	1,278,830.33
O. & G.	285,322.92	.....	285,322.92
Total	3,848,790.97	23,741.42	3,872,532.39
OTHER STATES AND TERRITORIES.			
Alaska	163.89	1.09	164.98
Arizona	53,771.21	638.06	54,409.27
British Columbia	3,753.80	9.46	3,763.26
California	448.80	1.91	450.71

STATEMENT OF BULLION OPERATED ON AT THE UNITED STATES MINT, DENVER, COLO., DURING THE CALENDAR YEAR 1895—Continued.

Source.	Gold.	Silver.	Total.
OTHER STATES AND TERRITORIES—continued.			
Idaho	$13,895.26	$54.39	$13,949.65
Mexico	1,481.42	11.74	1,493.16
Montana	2,804.69	12.76	2,817.45
Nevada	6,318.87	11.50	6,330.37
New Mexico	147,947.41	530.90	148,478.31
Oregon	2,144.31	11.44	2,155.75
South Dakota	64,181.65	198.34	64,379.99
Utah	73,651.70	110.99	73,762.69
Washington	106.90	.57	107.47
Wyoming	25,128.13	110.74	25,238.87
Total	395,798.04	1,703.89	397,501.93
MISCELLANEOUS.			
Jewelry	23,868.79	212.87	24,081.66
United States coin	267.26	.....	267.26
Foreign coin	572.74	.07	572.81
Redeposits	10,929.11	329.25	11,258.36
Total	35,637.90	542.19	36,180.09

RECAPITULATION.

Colorado	$3,848,790.97	$23,741.42	$3,872,532.39
Other States and Territories	395,798.04	1,703.89	397,501.93
Miscellaneous	35,637.90	542.19	36,180.09
Grand total	4,280,226.91	25,987.50	4,306,214.41

V

IDAHO.

By FRANK F. CHURCH,

Assayer in charge United States Assay Office at Boise, Idaho.

There are no special features incident to the mining industry of this State during the year 1895, except it be that the operations show a more general and systematic as well as a determined effort to develop the resources hereof.

The increase of production has been healthy and steady and, I may say, permanent. There has been no "boom" or excitement in mining, such as some of our neighbor States are experiencing, and yet all mining districts have had a considerable awakening to greater activity. Investors have probed to the bottom of all propositions in a way that shows the industry to be on a very safe and reliable basis.

Some of the largest producing mines have not been operated the entire year, for private reasons, and several of them have shown a variation of the usual per cent of each different metal. These facts will account for the shifting of the production in several localities.

PRODUCT OF GOLD AND SILVER IN IDAHO, BY COUNTIES, CALENDAR YEAR 1895.

Counties.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Value.	
Ada	1,966	$40,641	642	$830	$41,471
Blaine	3,150	65,302	150,766	194,025	260,227
Bingham	1,809	37,395	282	365	37,760
Bannock	458	9,468	83	107	9,575
Boise	16,429	339,617	7,954	10,284	349,901
Cassia	980	20,258	133	172	20,430
Canyon	823	17,013	189	244	17,257
Custer	1,018	21,044	92,341	119,388	140,432
Elmore	5,841	120,744	3,175	4,105	124,849
Fremont	984	20,341	152	196	20,537
Idaho	11,791	243,742	4,685	6,057	249,799
Lincoln	1,549	32,021	199	257	32,278
Lemhi	23,910	494,263	3,226	4,171	498,434
Oneida	732	15,132	91	118	15,250
Owyhee	35,204	727,731	1,297,814	1,677,944	2,405,675
Shoshone	18,439	381,168	2,471,300	3,195,144	3,576,312
Washington	425	8,786	148	191	8,977
Total	125,517	2,594,666	4,033,180	5,214,498	7,809,164

TOTAL PRODUCTION OF IDAHO DURING THE CALENDAR YEAR 1895.

Metals.	Quantity.	Value.
	Fine ounces.	
Gold	125,517	$2,594,666
Silver	4,033,180	5,214,498
	Pounds.	
Lead	65,752,037	2,301,321
Total		10,110,485

GOLD AND SILVER BULLION PRODUCED IN IDAHO DEPOSITED AT GOVERNMENT INSTITUTIONS DURING THE CALENDAR YEAR 1895.

Mints and assay offices.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Value.	
MINTS.					
San Francisco	4,247.550	$87,804.66	1,081.50	$1,398.27	$89,202.93
Denver	672.183	13,895.26	83.66	108.16	14,003.42
Philadelphia	392.955	8,123.09	279.30	361.11	8,484.20
ASSAY OFFICES.					
Boise	28,875.223	596,903.85	10,956.17	14,165.23	611,069.08
Helena	12,821.236	265,038.46	3,131.28	4,048.43	269,086.89
St. Louis	40.933	846.16	7.37	9.52	855.68
New York	4,159.498	85,984.45	827.04	1,069.28	87,053.73
Total	51,209.578	1,058,595.93	16,366.32	21,160.00	1,079,755.93

SOURCE OF DEPOSITS AT THE UNITED STATES ASSAY OFFICE, BOISE, IDAHO, DURING THE CALENDAR YEAR 1895.

Counties.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Value.	
IDAHO.					
Ada	966.187	$19,972.85	242.06	$312.96	$20,285.81
Blaine	2,154.634	44,540.24	1,723.56	2,228.39	46,768.63
Bingham	809.386	16,731.50	56.80	73.44	16,804.94
Bannock	158.332	3,273.00	39.68	51.30	3,324.30
Boise	11,338.611	234,389.90	2,954.21	3,819.50	238,209.40
Cassia	480.289	9,928.45	32.80	42.41	9,970.86
Canyon	423.075	8,745.73	89.07	115.16	8,860.89
Custer	367.997	7,607.18	333.98	431.80	8,038.98
Elmore	2,615.221	54,061.42	974.98	1,260.55	55,321.97
Fremont	584.347	12,079.53	61.83	79.94	12,159.47
Idaho	691.273	14,289.88	182.65	236.15	14,526.03
Lincoln	1,048.946	21,683.65	138.67	179.28	21,862.93
Lemhi	672.727	13,906.49	170.34	220.23	14,126.72
Oneida	431.562	8,921.17	51.36	66.40	8,987.57
Owyhee	804.679	16,634.20	2,420.07	3,128.91	19,763.11
Shoshone	5,103.284	105,494.25	1,385.69	1,791.57	107,285.82
Washington	224.673	4,644.41	98.41	127.24	4,771.65
Total	28,875.223	596,903.85	10,956.16	14,165.23	611,069.08
Deposits of Oregon	18,531.803	383,086.36	3,236.36	4,184.28	387,270.64
Redeposits	11,626.497	240,341.04	2,648.64	3,424.43	243,765.47
Total	59,033.523	1,220,331.25	16,841.16	21,773.94	1,242,105.19

VI

MONTANA.

By E. B. BRADEN,

Assayer in charge United States Assay Office, Helena, Mont.

The production of gold and silver in Montana during the year 1895 was, gold, 209,320.586 ounces fine, of the value of $4,327,040.32; silver, 17,701,658.11 ounces fine, of the coinage value of $22,886,992.19.

The gold product shows an increase of 22,185.333 ounces fine, valued at $458,611.45; the silver product shows an increase of 4,062,690.82 ounces fine, at a coinage value of $5,252,762.41, an increase in the gold and silver product for the year amounting to $5,711,373.86.

The increase in the gold production for the year 1895 is largely due to the opening up of new gold properties and the increased production of the copper mines. The extraordinary production of silver for the year 1895 should be credited to the increased production of copper, silver being a by-product.

By the following tables it will be shown that the total value of gold, silver, copper, and lead produced in this State during the calendar year 1895 amounted to $49,083,261.17, showing an increase compared with that of the previous year of a value of $9,616,342.04. These figures are based upon reports received from the United States institutions, smelters, and refiners handling Montana product, and from reports received from various producers in the State.

Attention is called to the table showing the amount of gold and silver produced in the copper and lead ores of the State. There were 8,828,146 ounces fine silver extracted from copper ores, showing that, of the total production of 17,701,658.110 ounces fine, 49.80 per cent of the silver was thus obtained, and the coming year will undoubtedly show a much larger percentage. Strictly speaking, there were but few exclusively silver mines operated during the calendar year 1895, owing to the low price of the white metal.

Placer mining during the year was not very active, owing to the lack of water, but the coming year gives a promise of an increased production of gold from placer diggings. A number of old workings are to be opened up the coming year by the introduction of new and improved methods.

A large dredging plant located on Grasshopper Creek, near Bannack, Beaverhead County, was operated for a few days at the close of the season and found to work successfully on deep deposits near bed rock.

Should this plant prove to be a continued success during the coming season it will undoubtedly lead to the working of a vast amount of old ground throughout the State which can not be worked by any other method.

The mining interests of this State give promise of being extremely prosperous during the next few years.

The tables showing the rate of wages paid will demonstrate that in no other locality in the world is the compensation of miners, mill and smelter men so great as in this State.

MILLS AND SMELTERS.

AVERAGE WAGES, HOURS WORK PER DAY, ETC., OF EMPLOYEES IN AND AROUND MINES, MILLS, AND SMELTERS IN PRINCIPAL EMPLOYING COUNTIES, AS TAKEN FROM REPORTS MADE BY EMPLOYERS OF 7,600 MEN, YEAR ENDING JUNE 30, 1895.

Occupation.	Cascade County.	Deer Lodge County.	Granite County	Jefferson County.	Lewis and Clarke County.	Madison County.	Park County.	Silver-bow County.
Amalgamator..per day..	.....	$4.00	.....	.....	.....	$4.00	.....	.....
Assayer.....per month.	$133.00	150.00 to 200.00	.....	.....	.....	.....	.....	$150.00
Blacksmiths...per day..	4.00	4.00	.....	.....	$4.00	3.75	.....	4.00
Blacksmiths' helpers, per day	2.50	3.25	.....	.....	2.50	.....	.....	.....
Bookkeepers and clerks, per month	100.00 to 150.00	125.00 to 150.00	.....	.....	.....	.....	.....	.....
Bricklayers ....per day..	6.00	6.00	.....	.....	.....	.....	.....	.....
Carpenters..... do....	4.16	4.50	.....	$4.00	4.00	.....	.....	4.50
Carpenters' helpers, per day	2.82	.....	.....	.....	2.50	.....	.....	.....
Concentrator men, per day	2.75–3.50	2.75	.....	.....	.....	.....	.....	.....
Crusher men...per day..	.....	3.00	$3.00	3.00	.....	.....	.....	.....
Dippers.....do....	4.00	4.00	.....	.....	.....	.....	.....	.....
Dynamo tenders...do....	3.50	.....	.....	.....	.....	.....	.....	.....
Electrolytic men...do....	2.62	.....	.....	.....	.....	.....	.....	.....
Electric crane men.do....	3.25	.....	.....	.....	.....	.....	.....	.....
Electricians.....do....	4.00	.....	.....	.....	.....	.....	.....	.....
Engineers.....do....	4.00	4.00	4.00	4.00	4.00	4.00	.....	4.00
Firemen.....do....	3.08	3.25	.....	3.30	2.87	.....	.....	3.25
Foremen.....do....	3.00–6.00	[1]105.00 to 230.00	5.50	.....	4.00	.....	.....	5.83
Feeders .....do....	3.25	3.50	.....	.....	3.22	.....	.....	3.75
Furnacemen.....do....	3.56	.....	.....	.....	3.00	.....	.....	4.00
Jigmen.....do....	.....	3.50	.....	.....	.....	.....	.....	.....
Laborers .....do....	2.25	2.50	3.00	3.00	2.25	.....	.....	3.00
Lead burners.....do....	4.88	.....	.....	.....	.....	.....	.....	.....
Lead burners' helpers, per day	2.87	.....	.....	.....	.....	.....	.....	.....
Machinists.....per day..	3.87	4.00	.....	.....	4.00	.....	.....	4.00
Machinists' helpers do....	2.75	3.50	.....	.....	.....	.....	.....	.....
Masons.....do....	5.00	6.00	.....	.....	5.00	.....	.....	5.60
Masons' helpers...do....	2.50	.....	.....	.....	2.25	.....	.....	.....

[1] Per month.

AVERAGE WAGES, HOURS WORK PER DAY, ETC.—Continued.

Occupation.	Cascade County.	Deer Lodge County.	Granite County.	Jefferson County.	Lewis and Clarke County.	Madison County.	Park County.	Silver-bow County.
Mill and battery men, per day	.....	$4.00	$3.66	$4.00	.....	$3.50	.....	.....
Pokers and graters, per day	$3.00	.....	.....	.....	.....	.....	.....	.....
Pot pullers.....per day..	2.25	3.00	.....	.....	.....	.....	.....	$3.50
Panners.....do....	.....	.....	.....	4.00	.....	.....	.....	.....
Rope splicers.....do....	3.00	3.00	.....	.....	.....	.....	.....	.....
Roasters.....do....	2.37	.....	.....	3.50	$2.37	.....	.....	.....
Samplers.....do....	2.67	.....	.....	.....	2.37	.....	.....	.....
Skimmers.....do....	3.75	4.00	.....	.....	.....	.....	.....	.....
Skimmers' helpers.do....	.....	3.50	.....	.....	.....	.....	.....	.....
Tappers.....do....	3.25	3.50	.....	.....	.....	.....	.....	.....
Teamsters.....do....	2.50	.....	.....	.....	.....	.....	.....	.....
Trammers.....do....	2.75	.....	.....	.....	.....	.....	.....	.....
Vanners.....do....	.....	4.00	.....	.....	.....	2.50	.....	.....
Weighers.....do....	2.93	.....	.....	.....	.....	.....	.....	.....
Watchmen.....do....	2.66	3.50	.....	.....	.....	.....	.....	.....
Hospital dues..per man..	1.00–1.50	1.00–2.00	1.25	1.00–2.00	1.00–1.50	1.00	.....	1.00–2.50
Board and lodging, per week	5.50	7.00	7.00	6.25	.....	6.00	$6.50	7.00
Hours work....per day..	10–12	8–12	8–12	8–12	10–12	8–12	10–12	8–12

MINES.

AVERAGE WAGES PER DAY, ETC., OF EMPLOYEES IN AND AROUND MINES, MILLS, AND SMELTERS IN PRINCIPAL EMPLOYING COUNTIES, AS TAKEN FROM REPORTS MADE BY EMPLOYERS OF 7,600 MEN, YEAR ENDED JUNE 30, 1895.

Occupation.	Deer Lodge County.	Granite County.	Jefferson County.	Lewis and Clarke County.	Madison County.	Missoula County.	Park County.	Silver-bow County.
Blacksmiths...per day..	$3.83	$4.25	$4.15	$4.25	$3.75	$4.00	.....	$4.10
Blacksmiths' helpers, per day	.....	3.00	3.00	.....	.....	.....	.....	3.00
Carmen.....per day..	3.00	3.50	.....	.....	.....	.....	.....	3.50
Carpenters.....do....	.....	4.00	4.00	4.00	.....	.....	.....	4.50
Clerks and bookkeepers, per month	.....	140.00	150.00	.....	.....	125.00	.....	150.00
Compressor men, per day.	.....	.....	.....	.....	.....	.....	.....	3.50
Engineers.....do....	3.70	4.00	4.00	4.00	.....	4.00	$3.50	4.00
Firemen.....do....	.....	3.00	.....	3.00	.....	3.50	.....	3.50
Foremen.....do....	5.33	a191.00	4.75	5.00	a127.00	5.66	4.00	a175.00
Laborers.....do....	2.69	3.00	3.00	3.00	.....	2.50	.....	3.00
Machinists.....do....	.....	.....	4.25	4.00	.....	.....	.....	4.17
Miners.....do....	3.33	3.50	3.40	3.50	3.14	3.50	3.25	3.50
Pump men.....do....	4.00	.....	4.00	3.50	.....	.....	.....	4.00
Rope men.....do....	.....	.....	.....	.....	.....	.....	.....	3.65
Shift bosses.....do....	4.50	4.00	4.08	.....	.....	.....	.....	4.75
Station tenders....do....	.....	.....	3.50	.....	.....	.....	.....	3.50
Timbermen.....do....	3.50	.....	3.50	.....	.....	3.50	.....	4.00
Tool sharpeners...do....	.....	.....	4.00	.....	.....	.....	.....	3.50
Teamsters.....do....	.....	3.00	3.00	.....	2.60	.....	.....	3.00

a Per month.

DEPOSITS AT HELENA ASSAY OFFICE DURING CALENDAR YEAR 1895.

Sources.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Commercial value.	
MONTANA—COUNTIES.					
Beaverhead	2,658.630	$49,462.82	400.88	$237.65	$49,700.47
Carbon	133.161	2,477.40	8.56	5.14	2,482.54
Cascade	38.788	721.63	10.21	6.10	727.73
Choteau	42.744	795.23	5.25	3.12	798.35
Custer	9.591	178.44	.73	.39	178.83
Deerlodge	21,356.315	397,326.62	5,001.78	2,886.50	400,213.12
Fergus	609.541	11,340.31	92.51	55.40	11,395.71
Flathead	440.508	8,195.50	29.73	17.29	8,212.79
Granite	7,826.885	145,616.40	1,574.61	891.50	146,507.90
Gallatin	334.721	6,227.34	192.16	114.97	6,342.31
Jefferson	5,876.718	109,334.23	769.29	455.75	109,789.98
Lewis and Clarke	28,846.990	536,687.99	18,788.64	10,871.43	547,559.42
Madison	12,359.466	229,943.42	6,683.11	3,856.20	233,799.62
Meagher	5,045.412	93,868.09	984.76	576.65	94,444.74
Missoula	2,893.430	53,831.21	193.35	111.76	53,942.97
Park	3,055.029	56,837.74	919.47	531.95	57,369.69
Silverbow	5,065.003	94,232.53	1,361.58	806.88	95,039.41
Ravalli	11.874	220.91	1.51	.90	221.81
Sweet Grass	10.583	196.89	3.36	2.02	198.91
Teton	420.209	7,817.85	19.27	11.33	7,829.18
Total	97,035.598	1,805,312.55	37,040.76	21,442.93	1,826,755.48
OTHER SOURCES.					
Jewelry	107.620	2,002.22	28.09	15.87	2,018.09
Redeposits	2,124.318	39,522.21	750.59	445.32	39,967.53
Idaho	14,245.817	265,038.28	3,479.31	2,016.02	267,054.30
Washington	5,784.676	107,621.83	2,063.03	1,170.65	108,792.48
Alaska	2,810.107	52,281.05	512.82	307.70	52,588.75
Colorado	240.567	4,475.66	59.61	32.23	4,507.89
Oregon	1,084.979	20,185.65	510.03	283.44	20,469.09
Wyoming	50.318	936.15	3.29	1.77	937.92
South Dakota	25.011	465.32	2.66	1.60	466.92
New Mexico	253.755	4,721.02	123.71	66.80	4,787.82
British Columbia	2,488.961	46,306.23	1,098.27	646.24	46,952.47
Total	29,216.129	543,555 62	8,631.41	4,987.04	548,543.26
Grand total	126,251.727	2,348,868.17	45,672.17	26,430.57	2,375,298.74

PRODUCTION OF GOLD AND SILVER IN MONTANA, CALENDAR YEAR 1895.

Summary by counties.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Beaverhead	3,025.607	$62,544.83	360,470.73	$466,063.14
Carbon	119.845	2,477.40	7.70	9.96
Cascade	34.909	721.63	9.19	11.88
Choteau	38.470	795.23	4.73	6.11
Custer	8.632	178.44	0.66	0.85
Deer Lodge	24,734.893	511,315.60	59,236.94	76,589.10
Fergus	548.587	11,340.31	83.26	107.65
Flathead	396.457	8,195.50	26.76	34.60
Gallatin	301.249	6,227.34	172.94	223.60
Granite	11,618.181	240,169.11	1,208,449.09	1,562,439.21
Jefferson	11,694.529	241,747.36	1,274,808.18	1,648,236.82
Lewis and Clarke	35,753.451	739,089.42	370,999.54	479,676.15
Madison	20,891.178	431,858.96	73,645.43	95,218.32
Meagher	4,554.362	94,147.01	279,379.23	361,217.58
Missoula	2,604.087	53,831.21	560,051.02	724,106.35
Park	2,749.526	56,837.74	827.52	1,069.92
Silver Bow	41,433.363	856,503.62	10,051,760.52	12,996,215.66
Sweet Grass	9.525	196.80	3.02	3.90
Teton	378.188	7,817.85	17.34	22.42
Ravalli	10.687	220.91	1.36	1.76
Custom smelters, mints, and assay offices, not elsewhere enumerated	48,414.860	1,000,823.96	3,461,702.95	4,475,737.15
Total	209,320.586	4,327,040.32	17,701,658.11	22,886,992.19

BULLION OF MONTANA PRODUCTION DEPOSITED AT HELENA ASSAY OFFICE DURING CALENDAR YEAR 1895.

Character.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Commercial value.	
Placer gold	23,451.465	$436,305.83	3,127.68	$3,639.47	$439,945.30
Mill bullion	73,584.133	1,369,006.72	33,913.08	39,462.48	1,408,469.20
Total	97,035.598	1,805,312.55	37,040.76	43,101.95	1,848,414.50

BULLION OF MONTANA PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING CALENDAR YEAR 1895.

Institutions.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
Helena Assay Office	97,035.598	$1,805,312.55	37,040.76	$43,101.95	$1,848,414.50
New York Assay Office	19,586.091	364,392.38	49,776.92	57,922.24	422,314.62
Denver Mint	150.753	2,804.71	21.46	24.97	2,829.68
San Francisco Mint	102.000	1,897.67	9.00	10.47	1,908.14
Philadelphia Mint	17.132	318.73	7.35	8.55	327.28
Total	116,891.574	2,174,726.04	86,855.49	101,068.18	2,275,794.22

GOLD AND SILVER ORIGINATING IN COPPER AND LEAD ORES.

Description.	Gold.	Silver.
	Fine ounces.	*Fine ounces.*
In copper ores	33,366.000	8,828,146.000
In lead ores	24,291.000	5,311,538.000
Total	57,657,000	14,139,684,000

PRODUCTION OF COPPER AND LEAD IN MONTANA, CALENDAR YEAR 1895.

Summary by counties.	Copper.	Lead.
	Pounds.	*Pounds.*
Beaverhead	239,631	1,326,997
Granite	2,710,940	.....
Jefferson	952,762	6,671,266
Meagher	.....	383,385
Missoula	.....	4,845,417
Silver Bow	197,190,659	.....
Custom smelters in addition to above	.....	10,912,439
Total for State	201,093,992	24,139,504

TOTAL MINERAL PRODUCTION OF MONTANA, CALENDAR YEAR 1895.

Description.	Quantity.	Value.
Gold, fine ounces	209,320.586	$4,327,040.32
Silver, fine ounces, at $1.2929+	17,701,658.110	22,886,902.19
Copper, fine pounds, at $0.10½	201,093,992.000	21,114,869.16
Lead, fine pounds, at $0.03½	24,139,504.000	754,359.50
Total value	.....	49,083,261.17

VII

NEVADA.

By J. W. ADAMS,
Superintendent of the United States Mint, Carson City, Nev.

Nevada's production of gold and silver for the calendar year 1895 was:

Gold	$1,780,204
Silver (coining value)	1,051,992
Total	2,832,196.

Compared with the preceding year (1894), these figures show an increase in gold of $559,504, and in silver of $54,492; an aggregate gain of $603,996.

Lincoln County shows the greatest gain ($440,384) in its gold product, more than tripling its output for the previous year. This large increase is almost entirely due to the mines in Delamar district, notably the Delamar and April Fool companies. Extensive improvements—the enlargement of their plant to double its capacity—by the Delamar Company and the erection of a ten-stamp mill by the April Fool Company are now under way, which will result in a largely increased yield from these properties for the year 1896.

Esmeralda County more than doubles its output for 1894, an increase of $95,174, which is mainly due to the increased production from Silver Star district, from which the most encouraging reports are received.

This district and the Hawthorne district, in the same county, promise a large increase in their gold product for 1896.

The Comstock Lode, Storey County, still holds its place at the head of the bullion-producing districts of Nevada, the yield for 1895 showing an increase in gold of $58,123 and a falling off in silver of $154,335.

The reports from Ely district, White Pine County, are very promising and justify the belief that the year 1896 will show a marked increase in the gold production of this county.

The gold properties of Nevada, both quartz and placer, never looked more promising than at the close of the past year, and from the reports at hand I confidently predict that the year 1896 will mark a new era in Nevada's gold production.

The number of men employed in the mining and milling business throughout the State is estimated at 3,500, 2,000 of whom are regularly employed at an average rate of $3 per day, the other 1,500 being prospectors and owners of individual claims, who are engaged in developing their properties.

The following tables are compiled from the reports received from mining companies, United States mints and assay offices, and the reports of the county auditors to the State comptroller for the three quarters ended September 30, 1895:

PRODUCT OF NEVADA FOR THE YEAR 1895.

[Estimated by Mr. J. W. Adams.]

Counties.	Gold.	Silver (coining value).	Total.
Churchill	$2,000	$5,000	$7,000
Douglas	5,729	277	6,006
Elko	44,753	54,736	99 489
Eureka	62,000	158,500	220,500
Esmeralda	177,174	5,948	183,122
Humboldt	41,220	122,428	163,648
Lander	12,548	67,028	79,576
Lincoln	652,384	49,876	702,260
Lyon	84,289	185,158	269,447
Nye	73,262	8,528	81,790
Storey	589,123	387,665	976,788
Washoe	5,500	1,000	6,500
White Pine	30,222	5,848	36,070
Total	1,780,204	1,051,992	2,832,196

ABSTRACT STATEMENT FROM QUARTERLY ASSESSMENT ROLLS OF THE PROCEEDS OF THE MINES OF NEVADA.

FOR THE THREE QUARTERS ENDED SEPTEMBER 30, 1895.

Counties.	Quantity extracted.		Gross yield or value.	Actual cost of—		Actual cost of reduction.		Total cost.
	Tons.	Pounds.		Extracting.	Transportation.	Free milling.	Freiberg process.	
Elko	2,015	607	$23,915.57	$10,693.65	$810.48	$15,573.64	.....	$27,077.77
Esmeralda	614	40	16,912.13	16,134.42	398.28	2,019.20	.....	18,551.90
Eureka	6,278	740	132,169.30	103,565.21	7,282.71	.....	$24,258.86	135,106.78
Lander	230	.....	46,976.41	76,082.67	.....	.....	.....	76,082.67
Lincoln	8,121	1,697	441,654.19	33,095.17	5,803.32	4,870.87	.....	43,769.36
Lyon	365	.....	14,059.50	9,961.02	101.55	722.00	.....	10,784.57
Storey	36,947	1,522	517,014.80	441,828.77	15,047.53	48,839.70	.....	605,716.00
White Pine	654	275	21,230.80	12,982.00	8,400.60	3,251.50	644.00	25,278.10
Total	55,224	4,881	1,213,932.70	704,342.91	37,844.47	175,276.91	24,902.86	942,367.15

ESTIMATED FOR QUARTER ENDED DECEMBER 31, 1895.

Elko	1,007	1,303	$11,957.78	$5,346.82	$405.24	$7,786.82	.....	$13,538.88
Esmeralda	900	517	30,487.23	21,417.62	629.38	3,194.86	.....	25,241.86
Eureka	2,087	1,531	44,056.43	34,521.73	2,427.57	.....	$8,086.28	45,035.58
Lander	76	.....	15,658.80	25,360.89	.....	.....	.....	25,360.89
Lincoln	3,046	867	258,462.38	24,516.03	3,146.96	1,983.46	.....	29,646.45
Lyon	182	.....	7,029.75	4,980.51	50.77	361.28	.....	5,392.56
Storey	12,314	1,803	172,338.26	147,276.25	5,016.17	49,613.28	.....	201,905.70
White Pine	327	196	10,615.40	6,491.00	4,200.30	1,625.75	322.00	12,639.05
Total	19,939	6,217	550,606.03	269,010.85	15,876.39	64,565.45	8,408.28	358,760.97

SUMMARY FOR THE YEAR 1895.

[Reported to State comptroller by county auditors.]

Items.	Three quarters ended September 30, 1895.		Quarter ended December 31, 1895 (estimated).		Total product.
	Ores.	Tailings.	Ores.	Tailings.	
Gross yield or value	$1,213,932.70	$172,446.59	$550,606.03	$59,482.20	$1,996,467.52
Actual cost of extracting	704,342.91	.....	269,910.85	.....	.....
Actual cost of transportation	37,844.47	5,956.39	15,876.39	3,486.91	.....
Free milling	175,276.91	85,516.91	64,565.45	42,208.47	.....
Freiberg process	24,902.86	.....	8,408.28	.....	.....
Total cost	942,367 15	91,473.30	358,760 97	45,695.38	.....

Quantity extracted for three quarters ended September 30, 1895, 55,226 tons and 881 pounds; tailings, 35,292 tons and 1,976 pounds; total, 90,519 tons and 857 pounds.

RECAPITULATION.

Source of production.	Value.
Product for three quarters ended September 30, 1895, as reported by county auditors to State comptroller	$1,386,379.29
Product for quarter ended December 31, 1895 (estimated)	610,088.23
Estimated product for year not reported to State comptroller by county auditors	835,728.48
Total product	2,832,196.00

VIII

NEW MEXICO.

By WALTER C. HADLEY.

During the year 1895 gold was produced in New Mexico in amount about equal to that mined in the year previous, but the silver output fell off much more than in any other year.

The well-known Hillsboro gold district furnished very little bullion, owing to a combination of circumstances in the affairs of the corporation operating there. The White Oaks district, almost exclusively gold, was also behind its better records of other years. The "Old Abe" and "Homestakes" were worked only a little more than half the year. A new plant was erected in place of that destroyed by fire upon the former mine. Pinos Altos put out about the usual value in gold.

The most important mining enterprises at present being prosecuted in the Territory are those in the extreme western portion of Socorro County, about Mogollon, in the mountains of the same name. Gold is the chief metal of value there. The merit of the veins was early recognized by experienced mining operators in Colorado and elsewhere, who perfected their titles and have gone forward with the work of legitimate mining by well-directed methods, and the bullion output has increased very rapidly.

There is every reason to believe that the district will steadily grow in importance. That it is so little known to the outside world is explained by the fact that it is not readily accessible. The distance by stage from Silver City is 85 miles.

Litigation prohibited work on the best properties in the Cochiti district in Bernalillo County, although the grade of ores shipped continued good, being above $100 per ton, of which one-third was gold.

There has been a very considerable increase in the mining population of the northern part of the Territory, chiefly in Colfax and Taos counties, and much work has been done in the way of development. Gold in small quantities has been produced by a large number of miners who do not deem any report important.

The Socorro smelter remains closed, but a new smelter has been erected at Kelly, 35 miles west of Socorro, in close proximity to the lead mines that have for fifteen years furnished the enormous quantities of lead carbonates that have been in demand in smelting in Colorado as well as in New Mexico.

All the gold ore now treated in the Territory is worked either by

amalgamation or made into copper matte. It is quite probable that during 1896 one or more mills will be put in operation to treat these ores by the cyanide process. In other instances this latter process has been demonstrated capable of showing a profit where amalgamation failed.

The average number of men at work for wages in the precious metal mines for each day in the year is about 800 at $2.75 in dry and $3 in wet mines, for a shift of ten hours, and there are probably 2,500 men engaged in prospecting and working for wages a portion of the time.

Following is a statement of the output of metals by counties in New Mexico. The values are estimated upon their average values in the open market.

STATEMENT OF THE OUTPUT OF METALS BY COUNTIES IN NEW MEXICO.

County.	Gold.	Silver.	Lead.	Copper	Total.
Bernalillo	$38,250	$18,925	.....	.....	$57,175
Colfax	175,000	18,000	.....	.....	193,000
Donna Ana	15,000	60,000	$28,000	.....	103,000
Grant	172,000	26,000	7,550	$5,500	211,050
Lincoln	195,000	4,700	.....	.....	199,700
Sierra	150,000	55,000	5,000	.....	210,000
Santa Fe	17,800	2,000	2,500	.....	22,300
Socorro	180,000	47,000	.....	.....	227,000
Total	943,050	231,625	43,050	5,500	1,223,225

IX

OREGON.

By CHARLES G. YALE.

The returns received at the mint at San Francisco from mines and mining companies in Oregon for 1895 are as follows:

Gold	$1,837,681.57
Silver	15,192.16
Total	1,852,873.73

In 1894 the returns were:

Gold	$2,113,356.42
Silver	10,351.00
Total	2,123,707.42

These returns show a falling off of gold product from the previous year of $275,674.85 and an increase of silver of $4,841.16, the net decrease of product from 1894 being $270,833.69. The lessened product is altogether due to largely decreased returns from Union County mines. The mines of the State, particularly those of southern Oregon, are now attracting considerable attention, and more or less capital is being invested. A number of gravel mines are being opened and equipped, which should give good results in the future.

Baker County again takes first place as a bullion producer, its yield showing an increase of $500,199.26 over the year 1894. It may be said that this increase is mainly due to more complete returns having been received the past year than in the previous one. Around Auburn the yield is not very large. Baker City, the principal mining region of the State, gives excellent returns for 1895, most of the increase in the county coming from that section. At Bourne are some large mines, the principal ones being the Eureka and Excelsior, which produced gold mainly, but some little silver also. At Baker City the largest producer is the Virtue mine. The gold from the small mines comes from both placer and quartz. At Bridgeport there are no large operations, though numerous mines make up a respectable product. The water was rather scarce for placer operations last season. At Connor Creek the largest property is that of the Connor Creek Mining and Milling Company. At Express the production was small, as was also the case at Haines and Hereford. At McEwens the mines are principally gravel. At Rye Valley, Sumpter, and Weatherby there are no large operations, smaller mines making up the majority of the producers.

Benton County shows about the same yield as the previous year, the product being altogether from the beach mines near Waldport.

The gold product of Coos County for 1895 is practically the same as it was in 1894, the main output being from the Salmon Mountain placers.

Crook County shows a small yield from the mines in the vicinity of Rural.

Curry County shows an output of about $3,000 more for 1895 than for 1894, the yield being mainly from the small mines near Eckley. The beach sands at Ferry, Gold Beach, and Port Orford make only small returns for the year.

Douglas County, which made returns of $70,879.38 in 1894, shows a yield in 1895 of $45,078.80. The main yield was from mines at Canyonville and Glendale.

From Grant County the returns received for 1895 amount to $101,853, as compared with $129,853.06 in 1894. At Canyon City the Humboldt is the largest producer. At Granite the yield is mainly from small mines. At John Day the Chinese placer mines return the entire yield. Prairie City, Long Creek, and Susanville show returns from small mines.

From Harney County, which made a yield of $1,500 in 1894, no returns were received in 1895.

Jackson County shows an increased yield, the returns for 1894 having been $107,647, while for 1895 they are $144,979, including $2,200 in silver. At Applegate the largest producer is the Layton mine. From Ashland returns show that development work only is being done. At Bolt are many small mines, but no large operations. A number of mines are being worked in the vicinity of Draper, but there are no large companies producing. From Gold Hill the returns received were few, and the same may be said of Jacksonville. Some little silver came from Phœnix. Only a few mines are being operated at Rock Point, Steamboat, and Talent. At Wimer there are a number of claims, but none of any magnitude in point of production. More returns were received from Woodville than from any other part of the county. The Saxe Creek is the largest producer at that point.

Josephine is, next to Baker, the largest producing county in Oregon, its yield for 1895 being $282,474.20, as compared with $123,676.61 in 1894—an increase for the year of $158,797.59. More complete returns were received this year than last, and there are more producing mines. At Althouse are many mines, but none of these are very large producers. There was quite a scarcity of water for the gravel mines in 1895, and numbers of the gravel miners turned their attention to quartz prospecting. Fewer mines than usual report from Browntown, and there is a smaller yield indicated. At Grants Pass quite a number of mines are operating, and the place is becoming an important mining center, second only, in Oregon, to Baker City. At Galice and Grave

there are no large operations, nor are there at Merlin or Murphys. From Kerby quite a large yield is reported from small operations. At Leland only small mines make report, and the same is the case with relation to Merlin and Murphy. At Waldo the Cameron Flat is the largest producer. While there are no large companies at Williams, the output of the many small mines makes up a respectable sum. At Wolf Creek a number of producers report, the largest being Coyote Creek, Lewis Quartz, and Kamm Quartz.

Lane County shows a couple of thousand dollars increase over its record for the previous year. The main yield is from the mines in Bohemia district on the borders of Douglas County. The district is in both counties, but the yield is credited to Lane, the returns coming to Cottage Grove post-office in that county. Some gold is also taken out of placers in this county.

Linn County, the gold yield of which is small, returns about $1,260 more than in 1894. The few mines are at Albany, Foster, and Sweet Home.

Malheur County, which produced $13,000 in 1894, gives returns for 1895 of $4,827 from mines at Malheur and Ontario.

Marion County, which only showed a yield of $985.88 in 1894, gives returns for 1895 of $8,410 in gold and $2,000 in silver. The gold was from Gates and Mill City and the silver from Salem.

In Tillamook County a few beach sand mines at Cape Lookout made nominal returns.

Union County, which in 1894 made returns of $1,067,170, mainly from mines at Cornucopia, Sanger, and Sparta, gives a total yield for 1895 of only $147,800. Dr. Jay Guy Lewis, who died recently, was accustomed to keep statistics of the product of the mines of the county, and these he always sent to the mint; since his death it has been found impossible to obtain returns from many of the mines on his lists. Moreover, from some of those which did answer, the returns are very unsatisfactory. In Cornucopia district there was very little ore milled in 1895. The explanation of this by one correspondent is that the ore was base and the parties did not understand the business, so that the work did not pay. The mills in the camp were nearly all idle in 1895, though some have started up since the beginning of this year. At Sanger a number of mines were worked, but all show a much reduced yield from previous years and many are idle. From Sparta the returns received were scant indeed, indicating that many mines were idle.

From Wallowa County the small yield shown was entirely from Snake River placers, near Joseph.

The number of miners employed in Oregon, as indicated by returns to inquiries made from the mint at San Francisco, is 4,754. It must be remembered that those enumerated are working at regular operations, and to them must be added those who are prospecting, working for themselves, or engaged upon unproductive properties making no returns

to the mint. In Baker County there are 325 miners working in the quartz mines (for $3 per day), 300 in the placers, and possibly 700 working for themselves in small claims or prospecting. This makes a total of 1,025. In Benton County there are 15. In Coos County the returns show 168. In this county the highest wages returned are $2 per day, and in some places the work is done by men for $1.50 and $1.25—Chinamen, presumably. Crook County shows only 10 men, at $2.50 per day. In Curry County the estimate of residents is 525 men, and the wages $2 and $2.50 per day. In Douglas County, according to the returns, there are 246. The Chinese get $1.50 per day, and whites $2 and $2.50, according to class of work. In Granite County there are 210, the wages being $2 per day. Jackson County shows 400 men at work. There are men employed in this county at $1, $1.50, $1.75, and $2 per day, according to the returns received. Josephine County has 1,300 men at work. The Chinese get $1.50 per day, and some as low as $1; other men get $1.75 and $2. At Kerby, where there are 250 men, the ruling rate is $40 per month and board. Lane County shows only 45 men at $1.75 and $2 per day. Linn County has 25. Malheur County has 35, with wages at $2.50 and $3 per day. Marion County has 90; Tillamook, 5; Union County, 345; and Wallowa, 10 men.

BULLION PRODUCTION OF THE MINES OF OREGON, 1895.

RECAPITULATION.

County.	Gold.	Silver.	Total.
Baker	$942,483.33	$7,962.65	$950,445.98
Benton	2,000.00	.....	2,000.00
Coos	106,443.00	.....	106,443.00
Crook	1,000.00	.....	1,000.00
Curry	11,930.00	.....	11,930.00
Douglas	45,078.80	.....	45,078.80
Grant	101,853.00	.....	101,853.00
Jackson	142,779.30	2,200.00	144,979.30
Josephine	282,474.20	.....	282,474.20
Lane	34,062.94	29.51	34,092.45
Linn	6,260.00	.....	6,260.00
Malheur	4,827.00	.....	4,827.00
Marion	8,410.00	2,000.00	10,410.00
Tillamook	280.00	.....	280.00
Union	144,800.00	3,000.00	147,800.00
Wallowa	3,000.00	.....	3,000.00
Total	1,837,681.57	15,192.16	1,852,873.73

X

SOUTH APPALACHIAN STATES.

By W. E. ARDREY,

Assayer in charge of the United States Assay Office at Charlotte, N. C.

The production of precious metals in the States of the South Appalachian Range in 1895, expressed in coining values, was—

Gold	$336,008.73
Silver	1,763.08
Total	337,771.81

Compared with the total of 1894, viz, $263,827.66, this shows an increase of $73,944.15, or 28 per cent.

The output for Maryland and Virginia was slightly less than in 1894, and for Alabama and Tennessee slightly greater, but in North Carolina, South Carolina, and Georgia the increase was very marked.

The silver was exclusively the incidental content of gold bullion; no auriferous or argentiferous lead or copper ores were treated, and the amount of ore shipped from the section was insignificant.

The production of the States is summarized in the following tables (A and B):

A.

STATISTICS OF PRODUCTION OF THE PRECIOUS METALS IN THE APPALACHIAN RANGE DURING THE CALENDAR YEAR 1895.

State.	Standard ounces.		Commercial value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Alabama	249.156	62.46	$4,635.45	$37.47	$4,672.92
Georgia	6,876.863	396.90	127,941.61	238.14	128,179.75
Maryland	26.809	2.07	498.76	1.24	500.00
North Carolina	3,680.591	618.76	68,476.11	371.25	68,847.36
South Carolina	6,870.294	415.30	127,819.43	249.18	128,068.61
Tennessee	17.975	.85	334.42	.52	334.94
Virginia	338.783	18.80	6,302.95	11.28	6,314.23
Total	18,060.471	1,515.14	336,008.73	909.08	336,917.81

B.

STATISTICS OF THE PRODUCTION OF THE PRECIOUS METALS IN THE APPALACHIAN RANGE DURING THE CALENDAR YEAR 1895.

State.	Fine ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Alabama	224.240	56.21	$4,635.45	$72.68	$4,708.13
Georgia	6,189.177	357.21	127,941.61	461.85	128,403.46
Maryland	24.129	1.86	498.76	2.41	501.17
North Carolina	3,312.531	556.88	68,476.11	720.01	69,196.12
South Carolina	6,183.264	373.77	127,819.43	483.26	128,302.69
Tennessee	16.179	.76	334.42	.99	335.41
Virginia	304.904	16.92	6,302.95	21.88	6,324.83
Total	16,254.424	1,363.61	336,008.73	1,763.08	337,771.81

MARYLAND.

The production in this State was mostly the result of petty operations about the Bethesda mine in the early part of the year. No information could be elicited of the probable course of mining in 1896.

The production is shown in Table C, below:

TABLE C.

	Standard ounces.		Commercial value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Maryland, miscellaneous	26.809	2.07	$498.76	$1.24	$500.00
	Fine ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Maryland, miscellaneous	24.129	1.86	$498.76	$2.41	$501.17

VIRGINIA.

In Virginia regular operations had almost ceased and very little petty work was accomplished. The Luce, in Louisa County, and the Kelly and the Gold Eagle, in Fairfax County, were the only mines specifically credited on the records of the United States Mint in 1895.

The Rappahannock, in Stafford County, and the Powhatan, in Culpeper County, were in operation a very short time in the beginning of the year.

In Louisa County a little work was reported in the neighborhood of the Luce and Slate Hill mines, and an examination of the Tinder Flats placers was made, but without such success as would justify a continuation of the work, chiefly from the insufficiency of the water supply. Some prospective work was done in Buckingham County.

Goochland County seems to have been the chief producer. Fully

one-half of the gold produced in the State left in such a way as to preclude location. The production of Virginia is exhibited below in Table D.

TABLE D.

County.	Standard ounces.		Commercial value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Fairfax	26.602	.38	$494.92	$0.23	$495.15
Goochland	190.737	3.33	3,548.61	2.00	3,550.61
Louisa	2.606	.62	48.48	.37	48.85
Miscellaneous	118.838	14.47	2,210.94	8.68	2,219.62
Total	338.783	18.80	6,302.95	11.28	6,314.23

County.	Fine ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Fairfax	23.942	.34	$494.92	$0.44	$495.36
Goochland	171.663	3.00	3,548.61	3.88	3,552.49
Louisa	2.345	.56	48.48	.72	49.20
Miscellaneous	106.954	13.02	2,210.94	16.84	2,227.78
Total	304.904	16.92	6,302.95	21.88	6,324.83

NORTH CAROLINA.

The output of North Carolina in 1895, as shown in Table E, was—

Gold	$68,476.11
Silver	720.01
Total	69,196.12

This amount was from widely scattered localities, no one mine or locality yielding notably, except from the nugget finds at the Crawford mine, Stanly County. The mining condition of North Carolina, though considerably in advance of that of 1894, and taking a stride forward to its old prosperity, is still unsatisfactory. It is impossible from the present incomplete condition of the enterprises projected recently to form any satisfactory opinion as to the probable prosperity of the mines in 1896, much less to predict safely any increase of importance in the near future. The late activity has led to extensive bonding and leasing, which does not necessarily mean subsequent productive work.

The disposition to introduce new processes and new or only partially tested machinery of novel form is occasionally seen, but none has been successful on a working scale. Vein mining has been quite spasmodic. The placer mining has received quite an impetus in Stanly, Montgomery, Randolph, and Cabarrus counties, where interesting "finds" of nuggets have been disclosed. The success of these localities has stimulated a wide search for others. The deposits have been found in quite unexpected places, with few external signs of gold. This kind of mining

is precarious, but is so attractive that more interesting developments are highly probable.

The gravel mining of the mountains, especially of the South Mountains, has been seriously interrupted by the greater inducements to engage in other kinds of mining, particularly of monazite, and this diversion bids fair to last for the present.

The only new enterprises in the State for the year were the cyanide works at the Sawyer-Mann mine, in Randolph County, and the chlorination plant of the Mecklenburg Works, at Charlotte. Both commenced work in the latter part of the year.

In the eastern belt the only mines in operation were the Portis, Harris, and Argo (Mann-Arrington); the petty work has fallen to small proportions. It is probable from the appearance of the preparations that more work will be effected in 1896.

In Moore County, the Cabin Creek mine (Burns-Alred) was worked on a small scale, though equipped with several Crawford mills. Some slight operations were undertaken at the Wemble mine, near Cameron.

In Chatham and Anson counties only petty work was undertaken.

The Hoover Hill mine, in Randolph County, continued in the same dormant state, being just kept free from water in anticipation of future extended work. At the Jones or Keystone a single campaign was run during the summer; at the Sawyer the cyanide plant was put in operation in December.

A special examination was given to the auriferous resources of Guilford County, which may be worthy of comment in this place. Practically nothing has been done in this county for many years, except so far as a slight reworking of the old tailings has been undertaken. The veins in this county are large and prominent and in the main well mineralized. The Gardner Hill was worked for a length of 5,000 feet and a depth of 250 feet; the Lindsay, McCulloch, and Jack's Hill is a stretch nearly 2 miles long and 200 to 300 feet deep; the Fisher Hill and the Millis Hill to a depth of 100 feet. The latter was the only one which had strictly gold-bearing sulphurets, and was worked as a gold mine per se. The others had large bodies of yellow sulphurets of copper of low-grade content in gold, but so rich in copper as to afford more inducement in working for that metal. For years immense shipments of copper ore were made, the gold from which never figured in the production of the State. On the exhaustion of the copper ores the gold was neglected, and the mines for the most part have remained closed. Immense piles of débris still are found on the dumps, most of which show a content in gold nearly as large as the ores contain which are now successfully worked at several places in this belt, but there is no indication of systematic work in the immediate future.

None of the mines in Davidson County were worked in 1895.

NOTE (April, 1896).—A notable find of nuggets has recently been made in Montgomery County, and a magnificent nugget of 246.83 ounces, troy, was found April 7, 1896, at the Reed mine, Cabarrus County.

In Rowan County the Bame was worked a few months, and the Rhymer (both the mine and the chlorination works) was operated till August and suspended till the opening months of 1896. The work at Gold Hill was very desultory, being confined to small parties working the tailings or remnants of the ore bodies near the surface. Nevertheless a considerable sum was extracted. The cyanide method is being experimented with on a small scale.

The large increase in Stanly County was due to the interesting discoveries at the Crawford mine, near Albemarle, in the early part of the year. The finding of several large nuggets in the bottoms adjacent to Camp Creek stimulated search for a mile up and down the stream and into the gulches adjacent to the deposits. Two nuggets of 8 and 10 pounds were among the finds and a considerable quantity of small nuggets and grain gold. So encouraging was the result that many localities of a similar character were examined in this and in the adjacent counties with some success. The Duke mine, 3 miles west of Norwood, is one of these recently opened mines. The operations at the Parker were mostly of a prospective nature, though some milling was done. Some work is promised at the Haithcock and Hearne and at the Crowell. The Lowder was under examination in the latter part of the year.

In Montgomery County the mining situation remained substantially unchanged.

In Cabarrus County, notwithstanding the extensive leases in 1893–1895, nothing material came from it in the way of development, except at the Rocky River and at the Reed, both of which were extensively opened up with a view to productive work. A nugget weighing 246.83 ounces troy was found April 7, 1896. The Klutx mine and some less-known localities produced some fine nuggets.

There was no change in the mining situation in Union County, the only regular work being done at the Bonnie Belle mine.

Any marked improvement in Rowan, Stanly, Union, and Montgomery counties is problematic, but in Cabarrus County the signs are favorable for a larger yield.

The Catawba mine, in Gaston County, the Graham, in Lincoln, and the Frazer, in Mecklenburg, are the only other points worthy of special mention where vein mining is done. The Vein Mountain, the Marion Bullion Company's mines, in McDowell, and the Piedmont Mineral Company's (J. C. Mills's) property, in Burke County, are likely to be largely worked.

The general situation in the South Mountain area has already been alluded to.

A special personal examination was given to the production in Cherokee County and to its present condition and prospective work. Much the greater part of the large production in this county came from the placers of Valley River and its tributaries and to some extent from the Hiwassee and from Peach Tree Creek, which runs to the east of the

Valley River and parallel to it some 5 miles distant. Probably no county of like area in this whole section has larger or more diversified mineral stores in the shape of limonite, marble, talc, and gold. The county is traversed from northeast to southwest by parallel ranges, and the conspicuous physical feature of the county, Valley River, is due to the fact that these mineral beds have offered less opposition to erosion than the inclosing schists. In consequence a fine valley has been formed, bordered along the whole length by mineral beds. A like statement may be made of Peach Tree Creek, for the folding of the extended mineral sheets has given rise to several anticlinals, which through erosion have left several parallel beds of these important minerals. The lateral spurs of these ranges give rise and direction to creeks feeding these main streams and to the even more important Hiwassee River, into which Peach Tree Creek and Valley River empty. The larger part of the auriferous stores of this county is concentrated in placers in these valleys, especially in the valley of Valley River, and to a lesser extent in that of Peach Tree Creek. The amount hitherto mined in this county is not a matter of record. The immediate source of the gold now mined is the placers in the bottoms of the streams, but the original seat was in the schists, or, more correctly, in the quartz seams traversing the schists so numerously and from which, by disintegration due to weathering, the placers were formed by concentration. The quartz seams traversing the marble may also have furnished a part of this gold.

The State geological survey has pointed out that these extensive limonite beds are frequently auriferous. During the special examination alluded to samples were taken over the most important outcrops for a distance of 2 miles and from the abundant "float" ore on the soil overlying the beds, assaying:

	Per ton.
Gold	$6.89
Silver	.43
Total	7.32

Samples were also taken from beds several miles away, the average of which ran from $2.68 to $5.85 per ton. It can hardly be doubted that the limonites are very generally gold bearing and that the weathering and the concentration of the outcrops has furnished a considerable part of the placer gold. Whether these limonites can be treated economically in the present condition of the gold industry is quite doubtful, but it would excite no surprise if at some points some part of the beds were rich enough to be workable for their precious metal contents. A fourth source is, unquestionably, the galenite carried so frequently by the marble.

At least six localities are known, from Murphy northeast, showing galenite assaying from $7 to $34 per ton. The present work is confined almost entirely to easily accessible gravel beds, but there is ample proof that the veins or ore channels in the schists have been productive and may again be so to rightly directed effort. The water supply

is large, for the numerous parallel ridges and the transverse spurs not only afford a large amount, but facilitate its transportation to the mining points with a large head of pressure. The production of the county is about $1,000 per year, and there is no prospect of immediate change, but the resources are too great to remain permanently in obscurity. Most probably when the large mineral industries of iron ore, marble, and talc have their great development the gold in like manner will be more largely mined.

TABLE E.

County.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
Anson	3.106	$64.21	.25	$0.17	$0.33
Burke	183.057	3,784.13	28.68	19.12	37.09
Cabarrus	135.671	2,804.59	20.76	13.84	26.84
Caldwell	53.654	1,109.11	8.23	5.48	10.64
Catawba	79.893	1,651.53	17.89	11.93	23.13
Cherokee	48.144	995.21	5.39	3.59	6.97
Cleveland	2.021	41.79	.50	.34	.65
Franklin, etc	216.768	4,480.99	10.22	6.81	13.21
Gaston	234.307	4,843.56	25.04	17.29	33.53
Guilford	5.842	120.76	2.01	1.34	2.59
Lincoln	4.922	101.75	.22	.15	.29
McDowell	226.622	4,684.70	140.48	93.64	181.62
Mecklenburg	197.665	4,086.10	17.34	11.56	22.42
Montgomery	106.036	2,191.96	21.51	14.34	27.81
Moore	67.686	1,399.18	35.95	23.97	46.49
Polk	28.311	585.25	2.82	1.88	3.64
Randolph	149.599	3,092.49	39.34	26.23	50.87
Rowan	147.824	3,055.79	25.92	17.28	33.51
Rutherford	66.191	1,368.28	7.39	4.93	9.55
Stanly	715.028	14,780.96	41.01	27.34	53.03
Union	86.432	1,786.72	18.63	12.42	24.09
Wilkes	.507	10.47	.12	.08	.15
Miscellaneous	553.245	11,436.58	86.28	57.52	111.56
Total	3,312.531	68,476.11	556.88	371.25	720.01

SOUTH CAROLINA.

The production of South Carolina in 1895 was—

Gold	$127,819.43
Silver	483.26
Total	128,302.69

being in excess of the production of 1894 by $34,539.22. This marked increase is due to the greater activity of the old mines and, in small part, to the opening of new ones.

The Brewer, in Chesterfield County, was not actively worked, and the entire effort was expended to develop the underground works for subsequent operations and in settling the conditions for mining and milling these large stores properly.

The Haile, in Lancaster County, was pushed with even more skill and vigor than in past years, and, having at command a somewhat better line of ores, a greatly increased output was the result. The administration of this mine still continues a model and the cost of treatment is steadily lowered year by year. The methods used here are increasing in favor and two new enterprises employing chlorination were introduced in this section in 1895.

The Thomson mine, in Union, and the West, in Spartanburg, were conducted, as in 1894, without material change.

The Blackburn mine, in Lancaster County, has recently been reopened.

More placer work was done than in many years, especially in Chesterfield and Lancaster counties.

The Blacksburg Smelting Works (The Carolina Sulphuric Acid Works) were actively at work during a part of 1895.

The gold-mining industry in this State is stably founded for permanent work and the yield is likely to be steadily maintained, if not increased, and will continue to be a model to the entire section.

The production by counties is shown in Tables F and G.

TABLE F.

County.	Standard ounces.		Commercial value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Chesterfield	120.551	3.71	$2,242.81	$2.23	$2,245.04
Lancaster	5,986.434	258.79	111,375.52	155.27	111,530.79
Spartanburg	16.086	1.61	299.27	.97	300.24
Union	430.140	99.70	8,002.60	59.82	8,062.42
Miscellaneous	317.083	51.49	5,899.23	30.89	5,930.12
Total	6,870.294	415.30	127,819.43	249.18	128,068.61

TABLE G.

County.	Fine ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Chesterfield	108.496	3.34	$2,242.81	$4.32	$2,247.13
Lancaster	5,387.790	232.91	111,375.52	301.13	111,676.65
Spartanburg	14.477	1.45	299.27	1.87	301.14
Union	387.126	89.73	8,002.60	116.01	8,118.61
Miscellaneous	285.375	46.34	5,899.23	59.93	5,959.16
Total	6,183.264	373.77	127,819.43	483.26	128,302.69

GEORGIA.

The yield in 1895 was—

Gold	$127,941.61
Silver	461.85
Total	128,403.46

a sum greater than in 1894 by $29,308.94, as shown in the accompanying tables (H, I).

Several new mines were put at work during the year and the conditions of all were favorable for steady work.

The leading counties producing ore are in the following order: Lumpkin, Cherokee, and McDuffie.

The forward movement was particularly evident in Lumpkin and Cherokee. The unfavorable condition of agriculture stimulated a greater attention to petty mining.

The work of Rabun, Habersham, Union, Cobb, and Lincoln was substantially the same as in 1893 and 1894.

The Collins mine, in Milton, the Charles, in Forsythe, the Gurrahee, in Hall, and Wilkes, in Meriwether, were operated with some constancy.

In White County there was a very marked decrease, for the petty work has almost ceased. Two new mines, the Hamby Mountain and the St. Georges, were put in operation in the latter part of the year. The work at the Loud Hose and Hydraulic mine and at the Mount Yonah, was intermittent.

In McDuffie County the Parks, Tatham, Egypt, Columbia, and Bell continued in operation during the year, the first with great steadiness.

The Dorn (Edwards) is nearly ready for work.

In Wilkes County, so far as could be learned, the Sandy Ridge was the only mine at work.

In Gwinnett is the Buford Company's mine, now nearly ready for steady work.

Lumpkin, as usual, shows the greatest diversity in its work. The mining population of this county is unusually intelligent and quick. The investors, as a rule, are men of large means, who are accustomed to deal with large problems. Accordingly the work shows many novel features. The free ores are not so abundant as formerly. The ore belts have been worked down to the sulphurets. This question is a perplexing one, though not so much so as in the Carolinas, for the percentage of sulphurets in Georgia would be regarded as a small percentage in the Carolinas. The following changes in practice are observable: More dependence on the mill and more attention to mill economy, a growing tendency to employ some cheap or even rough-and-ready concentration, and experiments with the sulphurets with reference to future use. The following mines are at work: Singleton, Lockhart, Garnet, Findley, Preacher, Mary Henry, Stanly, Josephine, Hedwig (Chicago and Georgia), Ralston, Barlow, Hand, Gordon, Chestatee, and two dredging enterprises. A mine is being opened on Crown Mountain, 1 mile south of Dahlonega, where a very large body of free-milling ore is found. At the Lockhart mine the combination of hydraulic and mill treatment has been abandoned and under-ground mining is practiced exclusively. A brief mention of the work at four points may be of interest to the mining engineer.

The Findley mine.—This mine is situated on the north bank of the Yahoola River, 1½ miles east of Dahlonega. The mill is situated on the bank of the river at the foot of a bluff 437 feet high, and the mine or ore cut is situated almost at the summit. The ditch supplying the water for hydraulicking the ore cut is 285 feet above the mill. The problem is to utilize the water supply of the ditch in the ore cut at a point 152 feet above its flowage automatically and without the intervention of a steam plant. It was solved by leading the water through a 16-inch steel pipe down from the ditch to the foot of the bluff, with a head of 285 feet, and into an apparatus (in duplicate) which is at once a motor and a pump—a motor in being operated by the water under its high head, and a pump in lifting water by a 12-inch pipe to the height of 437 feet and under pressure for application in the cut in hydraulicking the ore at a pressure.

The reservoir in the cut is said to contain 88,000 cubic feet, the stroke of the pump is 18 inches, and the piston speed 250 feet per minute.

Granting the economy of this method of utilizing the head of water, the problem has been worked out by the mechanical engineer in an admirable manner. The apparatus was constructed by a Milwaukee firm.

The Chestatee mine.—This mine is on the Chestatee River, about 2½ miles nearly east from Dahlonega and near Neisslers Ford, and comprises several hundred acres, with a river frontage of a mile or more. The aim is to change the course of the river into another channel and thus to lay bare for work the old bed, which has received the drainage of Yahoola River and of Towns, Tessentee, Cane, Camp, and Mill creeks, and of the many others of this well-watered section, all of which cut or traverse the gold belt and have for ages supplied it with a golden store. The preliminary work has for its aim the excavation of an artificial channel and to make the surface dirt or gravel removed therefrom pay the expenses of the excavation. The Hendy hydraulic gravel elevator, with some modifications, is the apparatus employed. In this apparatus, under the normal conditions of use, the water supplied under a considerable head is used in part for breaking down the gravel and in part for elevating this gravel to any desired level where it can be easily washed. The original mode of operating under a head is so far modified as to allow the application of a discharge from a Blake pump under 80 pounds of pressure at the inlet of the elevator and the dispensing with a standpipe for furnishing pressure. The result has so far been encouraging. Two dredging boats have for some years been operated in an intermittent manner lower down on the Chestatee, being sometimes above and sometimes below Newbridge. The two enterprises have some features in common, but enough dissimilarity to make a special description proper. The boats are quite like the dredging boats employed in most harbors for deepening the channels, but here the material is at once sluiced to remove the gold

and allowed to run back into the river only a few feet distant from its original place.

The Fry system, now at Newbridge, employs a single boat and is self-contained. Its dimensions are 40 by 20 feet, and it employs a 40-horse-power engine and 5 men per shift and uses 3 to 3½ cords of wood per day. The lifting system is an endless belt with 20 to 25 buckets. It is calculated to lift 80 cubic yards per hour, which is assumed to equal 80 tons. A small royalty is paid to the owner of the land adjacent to the dredge. The boat moves down the stream with the current, up the stream by a hawser, and across the stream by guys. It draws 3 feet of water. The material on being elevated by the buckets is lifted up and turned into sluices with riffles; thence to the river. The defect of this system lies in the weakness of the belt and the buckets, which are unable to stand the strain when large bowlders are encountered.

The Jacquish dredge, now some 2 miles below Newbridge, is built on a larger scale, being 70 by 30 feet. But side by side with the dredge is a scow provided with riffles. This apparatus is much more compact and substantial in every way. It dips by a scoop holding 1 cubic yard, and by watch it can make a complete lift easily in forty seconds. Its duty is calculated at 80 tons per hour. Nine men per shift are employed and 3 cords of wood per shift are consumed. The scoopful of river material is swung over the scow as soon as lifted and dropped into it and on to the sluices. The bowlders are at once thrown into the river, and the lighter material, after depositing its gold in the riffles, runs at once back into the river. A surprisingly large amount of gold is obtained in this way, but the returns are necessarily dependent on rich and poor places and much more on the character of the schists at the bottom of the stream, soft schists catching and retaining gold better than the hard.

The operations of Dawson County were confined almost exclusively to petty mining.

The Creighton mine, in Cherokee, is the largest single mining establishment in Georgia and accomplishes its large work with regularity. The Thies system is followed, the cyanide establishment, which it supplanted, proving too irregular for reliable work. There has been no noticeable change in its work the last twelve months, and it bids fair to continue its work with regularity and efficiency. Some prospecting has been done in this county, which may result in an additional output.

The work in Cobb and Carroll counties was exclusively given to placers.

Some large enterprises are in contemplation in the northwestern part of the State, but it is doubtful if they can be brought into effective work in 1896. The entire mining work of the State is in a far more healthy condition than it has been for several years and the large increase in output is likely to be maintained.

TABLE H.

County.	Standard ounces.		Commercial value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Carroll	71.193	0.92	$1,324.52	$0.55	$1,325.07
Cherokee	2,047.833	42.30	38,099.22	25.38	38,124.60
Cobb	59.523	5.68	1,107.41	3.41	1,110.82
Dawson	121.958	20.43	2,268.98	12.26	2,281.24
Forsyth	105.869	3.60	1,969.65	2.16	1,971.81
Gwinnett	24.765	5.75	460.74	3.45	464.19
Habersham	8.754	.....	162.87	.....	162.87
Hall	27.017	4.03	502.65	2.42	505.07
Lumpkin	2,258.253	151.70	42,014.01	91.02	42,105.03
Madison	8.271	.....	153.88	.....	153.88
McDuffie	1,056.036	110.96	19,647.19	66.57	19,713.76
Meriwether	201.680	.13	3,752.20	.08	3,752.28
Milton	12.279	.24	228.45	.14	228.59
Rabun	87.847	.53	1,634.36	.32	1,634.68
Towns	1.022	.....	19.00	.....	19.00
Union	14.381	.....	267.55	.....	267.55
White	370.762	28.12	6,897.90	16.87	6,914.77
Wilkes	58.370	7.48	1,085.93	4.49	1,090.42
Miscellaneous	341.050	15.03	6,345.10	9.02	6,354.12
Total	6,876.863	396.90	127,941.61	238.14	128,179.75

TABLE I.

County.	Fine ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Carroll	64.074	0.83	$1,324.52	$1.07	$1,325.59
Cherokee	1,843.050	38.07	38,099.22	49.22	38,148.44
Cobb	53.571	5.11	1,107.41	6.61	1,114.02
Dawson	109.762	18.39	2,268.98	23.77	2,292.75
Forsyth	95.282	3.24	1,969.65	4.19	1,973.84
Gwinnett	22.288	5.18	460.74	6.69	467.43
Habersham	7.879	.....	162.87	.....	162.87
Hall	24.315	3.62	502.65	4.69	507.34
Lumpkin	2,032.427	136.53	42,014.01	176.52	42,190.53
Madison	7.444	.....	153.88	.....	153.88
McDuffie	950.432	99.86	19,647.19	129.13	19,776.32
Meriwether	181.512	.12	3,752.20	.15	3,752.35
Milton	11.051	.21	228.45	.28	228.73
Rabun	79.062	.48	1,634.36	.62	1,634.98
Towns	.920	.....	19.00	.....	19.00
Union	12.943	.....	267.55	.....	267.55
White	333.687	25.31	6,897.90	32.72	6,930.62
Wilkes	52.533	6.73	1,085.93	8.70	1,094.63
Miscellaneous	306.945	13.53	6,345.10	17.49	6,362.59
Total	6,189.177	357.21	127,941.61	461.85	128,403.46

ALABAMA.

The detailed statement of production in Alabama in 1895 is shown in the following Table J.

Most of this was petty production. The only mine worked, so far as the United States Mint records show, was the Gregory Hill mine, in Tallapoosa County. The petty work was confined mostly to Cleburne and Tallapoosa counties.

A notable mine, famous in its day and long lost sight of, was rediscovered near Arbacooche, in Cleburne County—the Hilton mine. Some very rich ore was discovered, but only a small quantity was worked and the property was soon in litigation. Several companies commenced work near by on the supposed extension. It is quite probable that this locality may swell the returns in this State in 1896.

TABLE J.

County.	Standard ounces.		Commercial value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Cleburne	79.846	24.17	$1,485.50	$14.50	$1,500.00
Tallapoosa	145.529	33.79	2,707.51	20.27	2,727.78
Miscellaneous	23.781	4.50	442.44	2.70	445.14
Total	249.156	62.46	4,635.45	37.47	4,672.92

County.	Fine ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Cleburne	71.861	21.75	$1,485.50	$28.13	$1,513.63
Tallapoosa	130.976	30.41	2,707.51	39.32	2,746.83
Miscellaneous	21.403	4.05	442.44	5.23	447.67
Total	224.240	56.21	4,635.45	72.68	4,708.13

TENNESSEE.

The output of Tennessee is shown in the subjoined Table K.

This mostly came from Coker Creek and vicinity, in Monroe County, but a part of the product of the State could not be located.

Information has been received that a small mining plant is operated at this point and that another is at the Whippoorwill and Round Top mines, 5 miles north.

TABLE K.

County.	Fine ounces.		Commercial value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Monroe	12.472	0.57	$232.04	$0.34	$232.38
Miscellaneous	5.503	.28	102.38	.18	102.56
Total	17.975	.85	334.42	.52	334.94

TABLE K—Continued.

County.	Standard ounces.		Coining value.		
	Gold.	Silver.	Gold.	Silver.	Total.
Monroe	11.225	0.51	$232.04	$0.66	$232.70
Miscellaneous	4.954	.25	102.38	.33	102.71
Total	16.179	.76	334.42	.99	335.41

SUPPLEMENTAL.

TABLE C.

Cost of mining, including superintendent, sinking of two 7 by 12 foot shafts, diamond drilling, and all development work	per ton	$2.40
Milling, inclusive of all material	do	.16
Transportation of ore	do	.05
Concentration	do	.12
Chlorination and roasting	do	.19
Cost per ton of raw ore		2.92
Mine boss	per month	75.00
Machinist	do	50.00
Carpenters	per day	2.00
Unskilled labor	do	.90

TABLE E.

Mining, crushing, and transportation	per ton	$1.05
Milling and concentration	do	.37
Roasting and chlorination	do	.19
Administration	do	.123
Total cost per ton of raw ore		1.733

This includes dead work and all work from mining to bullion.

LABOR.

Ordinary	per day of ten hours	$0.80 to $1.00
Miners	do	1.25
Strikers	do	1.00
Machine drillers	do	1.50
Carpenters	do	1.25 to 1.50
Machinists	per month	50.00
Mine foreman	do	100.00
Amalgamators	per day	2.50
Helpers	do	1.00
Concentrator hands	do	1.25
Mill boss	per month	75.00
Labor in chlorination	per day	1.10
Chlorinator	per month	40.00

SUMMARY FOR SOUTH APPALACHIAN STATES.

Cost Per Ton of Raw Ore in 1895.

Table C.

Administration, development, expenses, and mining[1]	$2.40
Transportation[3]	.05
Milling	.16
Concentration	.12
Roasting and chlorination	.19
Total cost per ton	2.92

Table E.

Administration	$0.123
Mining, crushing[2], and transportation[4]	1.05
Milling and concentration	.37
Roasting and chlorination	.19
Total cost per ton	1.733

Comparative Cost of Labor.

Unskilled labor, per day	$0.90 to $1.00	Unskilled labor, per day	$0.80 to $1.00
Skilled labor ....do....	1.25 to 2.00	Skilled labor ....do....	1.25 to 2.50
Mine bosses....do....	2.50	Mine and mill bosses, do....	3.00 to 3.50

CAUTIONARY NOTES.

[1] Includes development, which in 1895 was unusually large, as the reserve ore bodies were low, while in Table E [2] less development work was needed than usual.

[3] Transportation apparently costs slightly less than in Table E [4].

Table E most nearly represents the best work and possibilities, as work here is most settled and systematic, but it will almost certainly happen in some years that extra development work will add something to the above cost.

GOLD FIELDS OF THE SOUTHERN APPALACHIANS.

By George F. Becker,
Of the United States Geological Survey.

GEOGRAPHY OF THE GOLD DEPOSITS.

Gold occurs along the Atlantic slope of North America from Newfoundland to Alabama. Northward of Washington it is found in commercially important quantities only in Nova Scotia, but some gold has been obtained to the eastward of the Green Mountains, both in Quebec and in Vermont. From near Washington southward the auriferous deposits are numerous, assuming their most important development in the Carolinas and Georgia.

In the Southern States the deposits may be divided into three groups, which bear interesting relations to the structure and the geographical features of the region. The first of these may be called the Georgian belt. It has been traced southward to the neighborhood of Montgomery in Alabama, and extends thence in a northeasterly direction through northern Georgia, passing near Canton and through the mining town of Dahlonega. It can hardly be said to reach northward beyond the boundary of North Carolina, but in that State a single vein has been worked which lies about on the strike of this belt. It is called the Boilston, and is about 17 miles west of south from Asheville.

The Georgian belt strikes substantially with the cleavage of the crystalline schists, or in the same direction as the folds and ridges of the main Appalachian ranges and the principal axes of folding which have marked the successive uplifts of that remarkable chain, but it lies to the southeast of these axes.

A second interesting area marked by gold deposits is the neighborhood of the South Mountains, in the heart of North Carolina. This isolated group of mountains does not conform to the ordinary Appalachian trend or configuration, a fact intimately connected with its geological structure. Though it is mainly composed of gneisses and schists, the principal cleavages strike to the west of north in this area, instead of to the east of north, as is the rule elsewhere. The relation of the quartz veins to the schistosity is also different from that characteristic of the two other regions, indicating some profound and quasi-permanent irregularity in the resistance of this part of the earth's external shell.

A third auriferous region lies parallel to the Appalachians, but far to the east. It is wider and less defined than the Georgian belt and is capable of subdivision. It is sufficient for the purposes of this paper to regard it as one belt, with Charlotte, N. C., near the center, extend-

ing to the southwest into South Carolina and, toward the northeast, two-thirds of the distance across North Carolina. It may be called the Carolinian belt. The deposits of Virginia lie substantially in the strike of this zone.

There are no mountains in the Carolinian belt, though some small hills have received from the population of the plains the name of the Uharie Range. There is a strong probability, however, that the topography was once varied by a range of volcanoes extending along this belt and reaching far to the northward.

The broad features sketched above can be followed on any topographical map of the United States. Sketch maps showing the position of the more important deposits visited, on a scale of 20 miles to the inch, will be found in the later portion of this paper. It would be desirable to display geological maps of the region, but the age of the rocks is at present too uncertain to justify the attempt. The immediate walls of those gold veins which have been mined are all, so far as known, pre-Cambrian; but the evidence on this subject is mainly negative.

Besides the three areas noted above there are other localities in which gold has been found. In Cherokee County, N. C., along the Valley River, a good many men have made wages in washing gravels, and other localities are noted in Messrs. Kerr and Hanna's Ores of North Carolina, but none of these are supposed to have yielded important quantities of the precious metal.

HISTORY AND STATISTICS.

The early European visitors to Florida and Georgia seem to have been impelled by the desire to acquire gold while saving souls. There is nothing remarkable, therefore, in the fact that the early narratives report the presence of gold in almost all regions—for example in New England. It is thus questionable whether some of the earliest reports of gold in the South were founded on observation or on hope. The first mention of the metal in this region is to the effect that on June 4, 1513, while Ponce de Leon lay near the southern end of the peninsula of Flórida, he was informed that a cacique in the neighborhood had a quantity of gold.[1] No further mention is made of the matter in this narrative. In 1516, however, Diego Miruelo obtained a little gold from the natives,[2] and in 1519 Pineda, who coasted along the western side of the peninsula[3] and along the Texan coast, reported that many of the rivers contained gold, and that the natives wore golden jewels.

The first definite information as to the occurrence of gold seems due to Pamphilo de Narvaez, who landed at Tampa Bay in 1527. Here he saw traces of gold, probably ornaments, and was informed by the

[1] Herrera, Dec. 1, Book IX, chap. 5.
[2] Barcia Ensaio Cronologico Año MDXVI, fol. 2.
[3] Navarrette, vol. 3, pp. 147–153.

natives that great quantities of it were found in a province called Apalache.[1] Hernando de Soto landed at Tampa Bay in 1539. He certainly made somewhat extensive explorations, but does not appear to have met gold in any abundance.[2] Soto is sometimes credited with having undertaken regular mining operations in the Nacoochee Valley and elsewhere; but the narrative of his expedition shows that he was too busily occupied with obtaining supplies and his favorite "sport of killing Indians" to undertake any serious mining operations.[3]

Somewhat more information appears in Lemoyne's Brevis Narratio of the journey made by Laudonnière in 1564.[4] The passages are curious enough to be worth extracting. Describing matters near the mouth of the river Mai (which is probably the Altamaha, though it has been thought to be the St. Johns[5]), he says: "Plenty of gold and silver is found among them, and they use them in internal commerce. As I learned from themselves, these metals were obtained from the wrecks of ships which had been thrown on the coast, and I am readily persuaded that this is true, for in the neighborhood of the Promontory [Florida] silver is more plentiful than to the northward. They assert, however, that in the Appalachian Mountains there are veins of copper (aes)."

Again he says: "That chief sent me a sheet of copper dug from those mountains, from the base of which flows a torrent rich in gold, or, as the Indians think, in copper: for from this stream they draw up sand in a hollow cane-like reed until it is full, then by shaking and jarring it they find grains of silver and copper mingled with sand. Hence they conjecture that there is a vein of this metal [sic] in those mountains."

[1] Relation d'Alvar Nuñez Cabeça de Vaca; Ternaux-Compans, Chap. IV, p. 29.

[2] Narrative of the gentleman of Elvas in Hakluyt.

[3] Winsor quotes Oviedo as remarking the Governor's fondness for this sport. Narr. and Crit. Hist., vol. 2, 1886, p. 246.

I owe most of the foregoing notes to the kindness of Mr. Woodbury Lowery.

[4] This is a famous work, of which De Bry was publisher, issued in 1591. The illustrations are by Lemoyne, who as artist accompanied Laudonnière's expedition.

[5] Parkman regarded it as the St. Johns (Pioneers of France in the New World, 1883, p. 32), but Lemoyne's map shows it as the largest river of the South, its main branch extending to the northwest into the Montes Apalatci, and placed much farther north than one would expect to find the St. Johns. Laudonnière also speaks of the Mai as one of three great rivers rising in the Appalachian Mountains and as being navigable for small boats from these mountains to the sea. This would answer to the Altamaha but not to the St. Johns. The other rivers of the triad are, I suppose, the Savannah and the Santee. On this map it has a southerly branch ending in a lake. On Delisle's map, which was originally issued in Paris before 1707, according to Mr. Justin Winsor (Narr. and Crit. Hist. of Am., vol. 2, 1886, p. 294), the river appears without the southerly branch and is called the Caouctas or May. This map is wonderfully accurate, considering the time at which it was prepared, as may be seen by comparison with modern maps, and the mouth of the May is shown at a distance north of St. Augustine almost exactly corresponding to the real position of the Altamaha. The copy in the library of the Geological Survey was issued in 1739. On Ottens's map, issued in 1755, the Altamaha bears the alternative title of the George River. The Survey library contains also a map entitled "A new and accurate map of the province of Georgia in North America." It is without date or author and appears to have been a folded sheet in some book. It now forms a portion of a collection of American maps made in England. The collector assigned to this sheet No. 92 the date 1760. On it the river in question is labeled "Formerly river May, now Alatamaha or St. George's River."

This river seems to have borne a somewhat evil fame in the last century, if one may judge by Goldsmith's Deserted Village, in which a gruesome description begins:

> "Through torrid tracts with fainting steps they go
> Where wild Altama murmurs to their woe."

The process thus described is illustrated by a drawing,[1] seemingly evolved from the description, upon which it throws no light. The legend of the drawing reads thus: "Manner of gathering gold in the rivers flowing from the Apalatcy Mountains. Far from the locality where our fort was built [the mouth of the Mai] there are great mountains, called Apalatcy in the Indian tongue, in which, as may be seen on the topographic map, rise three great rivers sweeping down sand with which is mixed much gold, silver, and copper. On this account the inhabitants of the region dig pits in the river so that the sand swept along by the water may fall into them by gravity. This, diligently extracted, is carried to a certain spot, and after some time, having removed the sand which had again fallen into the pits, they collect it and convey it in boats down the great river, called by us the Mai, which empties into the sea. Now, the Spaniards know how to convert to their own use the treasures thence obtained."

These passages need, and perhaps deserve, comment. It is remarkable that Laudonnière discriminates so imperfectly the three metals which he mentions. As for silver, it seems to me substantially certain that if the Indians possessed any it must have come from Mexico, possibly by hand to hand barter, but perhaps through the wreck of early Spanish ships. As for copper, there is little doubt that the French saw this metal in the possession of the Indians. There is no indication, however, that the natives ever mined copper in the Appalachians, although some native copper is to be found there, for example, in Alleghany and Ashe counties, N. C. Mr. R. L. Packard has discussed copper mining by the Indians,[2] and gives good reasons for believing that the only source of this metal in the United States was at Lake Superior. The Indians of Georgia no doubt possessed ornaments of this metal, received in barter, and highly valued by them. Indeed, early voyagers have stated explicitly that the Indians prized copper as highly as they did gold. When the French inquired whence the copper came, the reply would be, from the northwest, the same direction as that to which the gold was referred. There can be no doubt that the Indians also possessed gold. It was actually tested on the spot during Laudonnière's expedition,[3] and the locality from which the Indians said it came, as shown on Lemoyne's map, is the neighborhood of Dahlonega. Even within the last two years handsome nuggets of from fifty to a hundred pennyweights have been found in this region, and they must have been fairly abundant after rains in the sixteenth century. Mr. Packard suggests that a part of the confusion which arose as to aboriginal riches was due to the fact that mica was also a

[1] This curious plate is substantially reproduced in Brückmann's Magnalia Dei in locis subterraneis, Braunschweig, 1727, Tab. XII; where, however, the picture is reversed and some unimportant additions are made to the landscape.

[2] American Antiquarian, vol. 15, 1893, pp. 67 and 152.

[3] Hakluyt's translation of Laudonnière.

treasure among the Indians. It seems certain that they actually mined this mineral.

The French certainly did not see the washing of gold in canes. It is possible, as Mr. Packard thinks, that the description of the process is a distorted account of panning as practiced by or learned from the Spaniards. It is conceivable, however, that separation of gold dust should have been carried on in tubes instead of dishes. While panning is a process known throughout the Eastern Hemisphere, with minor modifications, and is no doubt of prehistoric origin, I have met with no clear and authoritative statement of the means originally employed by the American Indians in gathering gold from sands.[1]

As for the supposed ancient workings in the Nacoochee Valley, they are described as almost too modern in character even for the Spaniards to have made.[2] Dr. D. G. Brinton thinks the Indians are to be credited with some mining development.[3] Mr. C. E. Jones refers these workings to Tristan de Luna, remarking, however, that J. Lederer reported that the Spaniards were at work at mines as late as 1669 or 1670.[4]

During the eighteenth century little attention seems to have been paid to gold in the Appalachians. The earliest reference with which I have met is by Thomas Jefferson in 1782. He describes a lump of ore of about 4 pounds weight from the north side of the Rappahannock, in Virginia. It was found about 4 miles below the falls, and yielded 17 pennyweight of gold. He heard of no other indication of gold in the neighborhood.[5] A large nugget of gold was discovered at the Reed Mine, Carbarrus County, N. C., in 1799, but for some years its nature was not known. When this was ascertained further search was made and many more lumps were found. One of them weighed 28 pounds.

The history of gold mining in the Appalachians from the discovery of gold on the Reed property up to the year 1853 has been given by Prof. J. D. Whitney in a work so accessible[6] that the details need not be repeated here. From 1804 to 1827 all the gold produced in the United States came from North Carolina, and the total amount, so far as the records go, was only $110,000. Up to 1825 all the gold of that State came from washings; in that year Mathias Barringer made a successful excavation in Montgomery County, and soon afterwards good quartz veins were found in Mecklenburg County.

South Carolina first sent gold to the mint in 1829, but during the next year deposits were worked in Chesterfield and Lancaster counties.

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[1] I have been told that winnowing gold sands in half a gale of wind was practiced by the Indians in Arizona, and that the whites learned to work dry diggings from them; but I doubt these Indians going to so much trouble, and the report needs confirmation from early explorers.

[2] Hernando de Soto, by Charles E. Jones, jr. Savannah, 1880.

[3] Notes on the Floridian Peninsula, 1859.

[4] An abstract of Lederer's travels is given in Harris's Collection of Voyages and Travels, vol. 2, 1705, Appendix, p. 19, including references to the Spanish mines.

[5] Notes on Virginia. This work was completed in 1782 and a few copies were printed. The first English edition was issued in 1787.

[6] The Metallic Wealth of the United States, 1854.

In 1830 and 1831 from 100 to 200 hands are reported at work on the Brewer mine, in the first-named county.

The first discovery of gold in Georgia is said to have taken place in 1829 in Habersham County. A rush to the region took place, and as many as 6,000 or 7,000 persons were soon employed in gold washing in Northern Georgia. This excitement, however, soon abated.

After the date of Jefferson's note referred to above the first discovery of gold in Virginia is said to have taken place in 1831.[1] In 1836 there was considerable activity in gold mining in that State, as appears from the elder Silliman's report in 1837.[2] From the rediscovery to 1850 the product of Virginia is said to have been pretty steady, the annual value being between $50,000 and $100,000. In the early fifties an increased activity was manifested.

As for Alabama, there seem to be almost no recorded data. The discovery probably dates from the time of the gold fever in Georgia, 1830. "Of the yield of gold there is no record, or indeed of anything in connection with the matter, except that at such and such localities large numbers of men were engaged in the work and that at certain places it was said to be profitable."[3]

The civil war, of course, put an almost complete stop to mining operations in the South. The history of the mines of North Carolina from the close of the war to the end of 1886 has been very fully given by Messrs. Kerr and Hanna in a work to which I am greatly indebted.[4] No similar report has been published for the other gold-bearing States of the South.

The statistics of the gold production in the South have been collected by Mr. Stuart W. Cramer, and published in the production report of the Director of the Mint for 1892, and his table is reproduced below, with the addition of the Mint estimates for later years. These figures represent as the product of the respective States, not merely the gold actually deposited at the United States assay offices and the Mint, but a reasonable estimate of the remaining product.[5]

A curious bit of history affecting the accuracy of the statistics is the coinage of gold by one Bechtler, in North Carolina, about 1833 and for many years afterwards. It is said that for some time these coins and Mexican silver constituted the chief currency of large districts. To insure their reception the Bechtler coins were made slightly overweight, which of course led to their rapid disappearance.

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[1] According to Mr. Thomas Pollard, Commissioner of Agriculture, in a paper prepared for A. G. Lock's work, Gold, 1882, p. 187.

[2] Am. Jour. Sci., vol. 32, 1837, p. 98.

[3] W. B. Phillips, Geol. Surv. of Alabama, Bull. 3, 1892, p. 10.

[4] Ores of North Carolina, being Chap. II of vol. 2 of the Geol. of North Carolina, Raleigh, 1893.

[5] This is not explicitly stated, but according to Mr. George B. Hanna, op. cit., page 233, the official records of the United States to the end of 1886 give for North Carolina a little over eleven millions, while taking into consideration the gold used by local jewelers and the direct export from mines owned by foreign companies, Mr. Hanna estimates the real product at twenty-two millions. In Mr. Cramer's table the product for North Carolina to the end of 1886 is nearly twenty-one millions.

Estimate of the production of gold and silver in the Southern States from 1799–1879, and annually since.

Years.	Maryland.	Virginia.	North Carolina.	South Carolina.	Georgia.	Alabama.	Tennessee.	Total.
1799–1879...	$2,500	$3,091,700	$19,659,600	$2,587,900	$14,180,500	$365,300	$155,300	$40,042,800
1880.....	250	11,500	95,000	15,000	120,000	1,000	1,500	244,250
1881.....	500	10,000	115,000	40,000	125,000	1,000	1,750	293,250
1882.....	1,000	15,000	215,000	25,000	250,000	3,500	250	509,750
1883.....	500	7,000	170,000	57,000	200,000	6,000	750	441,250
1884.....	500	2,500	160,500	57,500	137,000	5,000	800	363,300
1885.....	2,000	3,500	155,000	43,000	136,000	6,000	300	345,800
1886.....	1,000	4,000	178,000	38,000	153,500	4,000	500	379,000
1887.....	500	14,600	230,000	50,500	110,500	2,500	500	409,100
1888.....	3,500	7,500	139,500	39,200	104,500	5,600	1,100	300,900
1889.....	3,500	4,113	150,174	47,085	108,089	2,639	750	316,330
1890.....	16,962	6,496	126,397	100,294	101,318	2,170	1,001	354,638
1891.....	11,264	6,699	101,477	130,149	80,622	2,245	519	332,975
1892.....	1,000	5,002	90,196	123,881	95,251	2,419	1,006	318,755
1893.....	114	6,190	70,505	127,991	100,375	6,362	250	311,787
1894.....	978	7,643	52,927	98,763	99,095	4,092	329	263,827
Total...	46,068	3,203,443	21,709,276	3,581,263	16,101,730	419,827	166,105	45,227,712

An encouraging item for the production of 1895 is a nugget weighing 8 pounds 5 ounces troy, found at the Crawford mine, Stanly County, N. C., on April 8.

The fineness of gold with reference to its geographical distribution is a matter of interest in some auriferous regions, for example in Australia, where the gold grows finer with increasing latitude. I can not discover any regularity in the distribution of fineness in the Southern Appalachians. Throughout Georgia the fineness is great and averages something like 0.950, excepting at the Loud mine, where it was 0.880 in 1858, according to Prof. W. P. Blake, while at the time of my visit it was reported as only 0.800. No cause for this exception is apparent. In the South Mountain area the gold was 0.825 fine, according to Genth, writing in 1875.

In the Carolinian belt the fineness is reported at or above 0.900 at many localities in the following counties: Orange, in Virginia; Cabarrus, Gaston, Mecklenburg, Polk, Rowan, and Rutherford, in North Carolina; Chesterfield, York, and Lancaster, in South Carolina. It is reported as below 0.900 in McDowell, Moore, and Union counties, in North Carolina. In the Davis mine, in Union County, N. C., it has even been as low as 0.450 when mingled with galena, and indeed, in Professor Hanna's opinion, it is the presence of galena which usually carries down the tenor of the bullion.[1] In Union County, S. C., also, the Harman mine had bullion of about the same grade as the Davis, according to Tuomey.[2] While I am not prepared to contest Professor Hanna's opinion of the cause of low-grade bullion, it seems certain that some gold not found in contact with galena or in deposits containing any extraordinary quantity of lead sulphide is low grade, while some mines in which the amount of galena is considerable yield high-grade gold.

[1] Eng. and Min. Jour., vol. 42, 1886, p. 201. See also Ores of North Carolina, 1887, p. 234.
[2] Geol. South Carolina, 1848.

THE ROCKS.

In outlining the general geology of the Southern gold fields it seems expedient to begin by rapidly reviewing the distribution of formations and then to proceed to descriptions of the several rocks.

To the northwestward of the Georgian belt a large area is occupied by the Ocoee formation, concerning the age of which different views are taken. Mr. Hayes informs me that in Tennessee the Ocoee unquestionably rests upon the Cambrian, but whether by deposition or by overthrust is not finally determined. It is doubtful therefore whether it is Paleozoic or Algonkian. The gold-bearing region near Murphy, in Cherokee County, N. C., is largely occupied by the Ocoee. Along the Valley River there are limestones[1] referred to this period and gneisses believed to be Archean. Between them are schists carrying gold in small quartz stringers; they underlie alluvium, and are so ill-exposed that it was not possible for me to ascertain to which series they belonged. To the east of Murphy, however, there are many quartz seams in the sedimentary rocks. They are probably to some extent auriferous, but I am not aware that they have been tested.

There is limestone near the Boilston mine in Henderson County, N. C., but the mine itself is in gneissic schists.[2] In Georgia the Ocoee does not appear to reach within several miles of the gold belt, and, excepting recent deposits, I saw nothing on this belt which seemed of sedimentary origin. The rocks are gneisses and crystalline schists probably of Archæan age, sometimes intersected by granite dikes which I suppose to be Algonkian.

So far as is known the rocks of the South Mountain area are of the same age as and lithologically similar to those in the Georgian belt.

Conditions in the Carolinian belt are much more complex. Here a belt of rocks which are in large part of sedimentary origin is bounded on the northwest by a plutonic area (the pyrocrystalline of E. Emmons and the Lower Laurentian of Kerr) and on the southeast for the most part by the Munroe beds and the Newark system. This belt is from 8 to 40 miles in width. From the character of the contact between it and the pyrocrystalline masses to the northwestward Mr. Nitze believes the granitic rocks to be intrusive masses of later date. This belt seems largely composed of metamorphosed sedimentary rocks of great age, chiefly clay slate, which occasionally shows bedding not concordant with the slaty cleavage. To this metamorphic series belongs also the limestone of the Kings Mountain mine in Gaston County.

These sedimentary rocks are nowhere known to contain fossils. They are far more metamorphosed than the Cambrian of more northerly portions of the Atlantic slope, and they contain a great amount of volcanic

[1] Small quantities of galena are found with the limestones, as well as gossans, such as overlie pyrrhotite deposits.

[2] Mr. Nitze found on the eastern side of Boilston Creek, nearly opposite the mine, contorted schists overlying the limestone. In the schists there are a few small quartz stringers which an assay proved slightly auriferous. The schists are probably Ocoee.

material which does not appear in the known Cambrian rocks of that slope. In the present state of knowledge they can only be referred to the Algonkian.

The volcanics occupy irregular patches in this slate belt. They are so sheared and decomposed as to have been taken for sedimentary material. Effusive lavas were first observed by the late George H. Williams.[1] They resemble the ancient eruptives of the South Mountain of Pennsylvania and Maryland. These are pre-Cambrian, and Mr. Keith has found fragments of them abundant in the Cambrian beds.[2] It seems to have been in these volcanic rocks that E. Emmons found the structures which he supposed to be organic and named Paleotrochis. Spherulites in the same rocks have apparently been mistaken for conglomeritic pebbles.

Near Monroe, in Union County, N. C., there are shales and slates far less modified than the Algonkian schists described. This series can be followed along the railroad from Monroe eastward to Polkton, a distance of some 20 miles. They appear at Albemarle, in Stanly County, and near the Sam Christian mine, Montgomery County. The Monroe beds were noticed by Prof. J. A. Holmes, who has not yet published his observations, and independently of him by Mr. Nitze and myself working in company. Professor Holmes observed them dipping beneath the Newark beds near Polkton. This series has not yet been studied and may prove fossiliferous. The prevalent degree of metamorphism is about the same as in the least-altered portions of the Ocoee.

The Newark system of the Carolinas is regarded as Triassic by Dana in the last edition of his Manual of Geology. Prof. I. C. Russell thinks it corresponds with the upper portion of the Trias and the lower portion of the Jura.[3] Messrs. Cope and Leidy have described vertebrate remains from this system in North Carolina, and many plants have been described by E. Emmons and others. In a quarry of red sandstone near Moncure, Moore County, N. C., I found a fragment of bone which Mr. F. A. Lucas reports as probably dinosaurian.

All the rocks of the Carolinian belt carry gold deposits. The main ore body of the Kings Mountain mine is in limestone; a long list can be made of the deposits in metamorphic slate; while eruptive or intrusive masses appear as wall rocks in the Hoover Hill, Parish, Jones, Silver Hill, Russell, Moratock, Sam Christian, Phœnix, Pioneer Mills, Ferris, Davis, Haile, and Brewer.

The Monroe beds are cut by a few stringers which have been worked for gold, though with small success. As compared with the older slates, this series seems to carry very little quartz. In a solitary instance it is reported that an auriferous quartz seam in the slates penetrates upward through the Newark sandstones. This case is reported by

[1] Jour. of Geol., vol. 2, 1894, p. 28.

[2] Fourteenth Ann. Rept. U. S. Geol. Survey, p. 302.

[3] Bull. U. S. Geol. Survey No. 85, 1892, p. 130. For a summary of the life records in North Carolina and elsewhere, see the same publication, p. 54.

Lieber from the Brewer and Edgeworth mine in Chesterfield County, S. C. He gives a figure showing the vein, but his description amounts only to a few words, from which it is not certain whether or not he saw the vein himself. He mentions it as "entirely worked out," which may mean that he saw only a trench through the sandstone to the underlying slates.[1]

Transported gold certainly occurs in the Newark sandstones. The only published note on this subject known to me is by Mr. Jules Marcou, who, in 1862, stated that the red sandstone of North Carolina contained gold washed into it during its formation.[2] Near Moncure, in that State, I washed out some allothigenetic gold from Newark beds, as will be mentioned in describing the ore deposits.

The greater part of the gold I believe to have been deposited at the close of the great volcanic era, or during the Algonkian. In the Carolinian belt this conclusion seems inevitable, and I know of no good ground for supposing the ore and the granitic dikes of the South Mountain area and of Northern Georgia to be younger. Gold deposition was seemingly renewed with diminished activity after the Ocoee and after the Monroe beds were laid down. Perhaps there were veins formed after the Newark system, but the evidence of this is too meager to be satisfactory. A similar report comes from Nova Scotia, but is not credited by geologists familiar with the locality.

Much the most abundant rock in the gold-bearing regions of Georgia and the Carolinas is gneiss, or schist immediately recognizable as derived from gneiss. Such is the greater part of the Georgian belt and almost all of the South Mountain area. In the Carolinian belt gneiss is abundant, but so also are other rocks. The composition of the gneiss is variable, even in small areas. Some of it contains orthoclase and microcline, but in much of it, and seemingly in the greater part, the predominant feldspars belong to the albite-anorthite series. The quartz is fairly abundant as a rule, but sometimes present in very small quantities. Biotite and muscovite prevail in some portions, while hornblende characterizes much of the mass, and augite is not infrequent. Of the rare minerals so abundant in the South Mountain area, Mr. Nitze has found monazite in the gneiss.

In this area there are many of the dark, globular blebs so abundant in various granitic regions, but none such were observed in the Georgian and Carolinian belts. Near Brindletown these blebs retain their coherence after the gneiss is completely rotten. These masses are almost wholly made up of augite or hornblende, or both, and in one case hypersthene was found to be abundant. There is apparently an ill-defined concentric structure in the blebs, which is developed by weathering, but it is not sufficiently marked to be clearly seen in hand specimens. In two cases observed the augite is about half decomposed to serpentine, and in one case hornblende is changed to talc.

[1] Survey of South Carolina, First Ann. Rept., 1856, p. 51.
[2] Proc. Boston Soc. Nat. Hist., vol. 9, 1862, p. 47.

In the Georgian belt the banding of the gneisses is exceedingly sharp, and it is manifest that the mineralogical character of the mass often changes within a millimeter from highly ferromagnesian to highly feldspathic. This is a phenomenon common in all gneissic areas. Messrs. Geikie and Teall have studied such banding or sheeting of rocks in Tertiary gabbros. They conclude that it arises from the intrusion of magmas which were already heterogeneous before they reached their present position.[1] This conclusion seems to me inevitable. I feel inclined to go a step farther. If the heterogeneous mass was fluid, it was certainly composed of miscible fluids, for the minerals composing the different bands are as a rule substantially the same, the relative quantities only being different. All prevalent ideas of the history of granitic magmas would also lead one to believe that these fluid masses must have been in contact for a very long time, probably for many years. Now if two miscible fluids are placed in contact with each other the process of mixture begins of itself, and diffusion continues until a uniform state of mixture is attained.[2] Either then the gneisses were fluid for a very short time relatively to the rate of diffusion of the fluids, which is hard to believe, or the magma was not really a fluid at all. This also appears at first difficult of belief; but a mass having the physical properties of tallow at ordinary temperatures might apparently be intruded, under great pressure, as well as the granitic magmas, and tallow is a true solid. The hypothesis of a substantially solid magma, perhaps moistened throughout with a small amount of a real fluid, would also explain thoroughly granular structure; for in a mixture of fluids capable of diffusion minerals would separate out successively, and not almost simultaneously, as must be the case to produce granular structure. In a magma such as that suggested the chemical composition would vary from point to point, and so would the chemico-physical reaction which involved the most rapid evolution of heat or the maximum dissipativity.

The gneisses are sometimes nearly devoid of structure, but truly structureless granitic rocks are somewhat rare in the gold fields. Some granite proper is reported to exist upon Yonah Peak, near Nacoochee, Ga.; at Dunn's Mountain, in Rowan County, N. C., there is a granite quarry, and there is a large amount of this rock between the Haile and Brewer mines. Granite dikes occur in the South Mountain area, and they are abundant near Nacoochee, as well as in the vicinity of the Franklin mine. In almost all these cases the dike rock contains much microcline. The rock is often very light in color and much coarser toward the center of the dike than at the edges. There are also very fine-grained granite dikes, however, near Brindletown, at Nacoochee, and on Setting Down Creek in the neighborhood of the Franklin mine. These do not seem to differ in any definable respect from the coarser granites excepting in grain and in the amount of mica they contain.

[1] Quart. Jour. Geol. Soc. London, vol. 50, 1894, p. 652.

[2] See for example Clerk Maxwell on Diffusion, Encyc. Brit., 9th ed.

Some of them are much wider than some of the coarse or pegmatitic dikes occurring within a few yards of them, and why they should have failed to develop large crystals it is hard to imagine.

In the Georgian belt there are bodies of dark amphibolite schist, such as are often produced by dynamometamorphic processes from basic massive rocks. No such unsheared masses, however, were observed at the mines visited; but Mr. Hayes has found in Cobb County, to the southwest of the Franklin mines, areas of dark diorite some miles in diameter which pass over into schists similar to those at Dahlonega and elsewhere.

The porphyries of the Carolinian belt are so decomposed in the neighborhood of the mines that little can be made of them. They seem to belong in great part to the acid series and to be allied in the closest manner to those in the South Mountain of Pennsylvania, as has already been mentioned. They show flow structure in some cases and were probably in part glassy and tuffaceous rocks, yet they were most likely deeply buried at the time of the formation of the deposits.

In some instances the ores occur in close association with dioritic and diabasitic rocks which do not appear to be mere dikes. Thus, at the Phœnix mine the dumps show great quantities of a plagioclase porphyry carrying hornblende, augite, and biotite. This porphyrite contains many stringers of ore, and it was reported to me that most of the ore in the mine occurred in it. The workings were entirely inaccessible. At the Reed, Pioneer Mills, and Hoover mines similar porphyrites appeared from the dumps to be wall rocks, but no exposures could be seen.

There are dike rocks in the Carolinian belt which seem clearly connected with the deposition of ore. Much the clearest case is that of the Haile mine. Here the dikes are diabase, which is fresh, excepting where the ore bodies lie along it. At the Silver Hill also, a dike rock which seems to be a decomposed diabase lay in contact with ore, as appears from masses on the dump, and at the Gold Hill, a diabase dike passes through the ore-bearing ground. Near Charlotte, at the Ferris mine, a granite dike lies in contact with ore. In the neighborhood of the same town there are great numbers of dikes and also many ore deposits, but as scarcely any of the mines are open it was impossible to study the relations of the intrusives to the auriferous material.

Besides such dikes there are later ones which cut the Triassic sandstones of North Carolina, for instance near Moncure. It is lithologically an ophitic olivine basalt. A dike rock entirely similar to this was found near the Howie, and is probably of the same age. It is needless to say that it may sometimes be difficult to distinguish between dike rocks of different ages in the Carolinian gold belt.

When the gneisses are reduced to schists by dynamometamorphic action, the feldspars appear to be resolved into quartz, muscovite, and calcite. Many of the schists have a composition answering to the com-

plete resolution of the feldspars and the removal of the calcite; in other words, they consist of quartz, biotite, and muscovite. This muscovite seems to correspond to the variety sericite. It is conceivable, however, that more or less vermiculite should be mingled with the mica, though in the studies made for this paper none has been detected. When the muscovite is present only in very small scales, the schists look as if they might be talcose. In most descriptions of the Southern gold fields talcose schists are frequently referred to. Attention was long ago called to the fact that this term is in many cases a misnomer,[1] and in no case have I met a true talcose schist. Talc indeed occurs in the South Mountain district as a decomposition product of the amphibole-pyroxene blebs in the gneiss, and where such masses are reduced to schist of course these may be talcose. It is safe to say, however, that the great mass of the supposed talcose schists of the region are muscovite schists, containing much mica in small scales.

Quartzites have been reported from the region of Dahlonega. I observed no rocks in that region which seemed recognizable as sedimentary, but there are fine-grained, highly quartzose schists similar to the so-called talcose schists excepting that they carry less mica. These may have been called quartzite.

In the Carolinian belt, at many of the points where ancient volcanic rocks have been detected, there are flinty masses which have been called quartz rock, chert, etc. They pass over into highly siliceous schists. Under the microscope they show small interlocking grains of quartz looking very much like vein quartz and giving no evidence of growth from fragments, but always mingled with minute scales of muscovite. There seems strong reason to suppose these masses due to decomposition and recrystallization of the acid volcanics.

The simple quartz-mica schists are more abundant than any other schistose rocks. Chloritic schists often carrying epidote are also common, however, and appear to answer to the amphibolic and pyroxenic gneisses and the diorite. Amphibole schists are less abundant and seem to originate in the dioritic rocks mentioned above. At the Franklin mine zoisite makes its appearance in some of the schists; also near the Sixes mine, Cherokee County, Ga., and the same mineral was recognized in the slate of the Bonny Bell mine, Union County, N. C.

In view of the fact that some of the garnets of the region are auriferous, the localities in which garnet-bearing schists have been noticed are of interest. Some of the schistose rocks of the South Mountain area are garnetiferous. At the Lumsden property, near Nacoochee, the schist contains many disseminated garnets, as well as numerous stringers of auriferous quartz. With Mr. Lumsden I gathered many garnets from the rotten schists. These crystals were carefully cleansed, then crushed and panned. They showed an amount of gold answering to

[1] See C. H. Hitchcock, Proc. Am. Assoc. Adv. Sci., 1859, p. 321. Dana states that most of the so-called talcose schist is sericite schist: Manual, 1895, p. 89.

many dollars per ton. The schists at the Findley mine, Dahlonega, and at the Hedwig, near Auraria, are garnetiferous, and at the latter locality they are also auriferous. Garnets are extraordinarily abundant at the Battle Branch mine, Auraria. Professor Credner mentions garnetiferous schist on the Chestatee River. There is garnet in the wall rock of the Franklin mine and at the Sixes. Credner found this kind of schist at the Burnt Hickory mine, 12 miles southwest of Ackworth. In Alabama it is reported from Silver Hill, Tallapoosa County.

Near the town of Ellijay, Ga., Mr. Arthur Keith has found ottrelite schist closely associated with garnet-bearing schists, and it is very probable that some such may occur near some of the gold mines.

It is very manifest, both macroscopically and microscopically, that the garnets (and the ottrelites) have crystallized in the schists after the schistose structure was fully developed. The energy of crystallization was sufficient to push apart the schistose laminæ and make space for the new growth. This seems to imply that a portion of the constituents of the mineral must have been derived from solutions, and the fact that garnet also appears in quartz veins at Dahlonega shows that all of the constituents may have existed in solution. It is very difficult for me to understand how garnets, pyrite, and other minerals can attain good crystallographic development in solid, tough rocks. In view of this fact, is good idiomorphism an infallible sign of the early genesis of crystals in igneous rocks?

STRUCTURE.

In the southeastern States almost the entire mass of the older rocks is schistose, the strike of the planes of cleavage in most cases being that of the Appalachian range, or N. 30° to 50° E. Where sedimentary strata occur, they too usually strike in approximately this direction in consequence of the folding which has built up the range; and as a consequence of this fact the cleavage of the schists has very often been mistaken for bedding.

In the Georgian belt the schists (and the banded gneisses as well) strike in the usual direction, the prevailing dip being to the southeastward at angles ranging from 40°, or somewhat less, upward. To this general rule there are some exceptions. At Nacoochee the western portion of the area shows schists with a westerly dip. Mr. Keith informs me that this change is local, but that in the Blue Ridge, to the westward of Nacoochee, there is what may be called an anticlinal axis of schistosity. By a similar analogy the change at Nacoochee may be likened to an undulation. In other parts of this belt there are abnormal dips, but they prevail over areas so small that they must be regarded merely as local irregularities. Such are particularly noticeable at Dahlonega, where, for example, in the Lockhart and Preacher mines, the schists dip and strike in various directions. In spite of such divergences the representative strikes and dips at Dahlonega are

northeasterly and southeasterly, respectively, and this is true of the entire belt from Nacoochee to the Sixes mine, below Canton, and beyond.

The structure of the South Mountain area is peculiar. The strikes of the schists are more irregular than in most parts of North Carolina, but over an area of at least 400 square miles the representative strike is N. 20° W., and the schists dip to the northeastward. To the north and south of this region the strikes and dips resume their normal directions, so that if one considers an area stretching entirely across the Carolinas the strike undergoes a deflection in the South Mountain area, the schistose surfaces being bent to the westward, but recovering their ordinary position after this area is passed.

This deflection must be caused by some inequality in the resistance of the earth's outer shell, and I was anxious to ascertain whether the irregularity in structure was purely local or extended into the main range. On inquiry of Mr. Keith, he informs me that the area in question is on the direct prolongation of a zone of shear or warping, traced by himself through Tennessee and into North Carolina. "The zone is marked by a motion of the northern masses past the southern ones so as to produce an abnormal strike. It is attended by other structural irregularities."

In the Carolinian gold belt the strike of the schists is usually nearly the same as in the Georgian belt, but the prevailing dip of the schists is northwesterly, and there are very few exceptions. The average dip is about 60°, notably steeper than in the Georgian belt. At the Jones mine, Randolph County, a steep southeasterly dip was noted by Emmons, but I saw only steep northwesterly dips, and at the Russell some of the schists strike northwestward, dipping northeast, but this is a mere local twist, less extensive than the mine workings. At the Means mine, near Charlotte, the dip is easterly. At the Brewer mine, in South Carolina, opposite dips appear within a few yards of one another, and near the West and the Thompson mines the dip is southeasterly, though in these mines it is northwesterly. Lieber's description of the Mud Vein, in the same region, seems to indicate a southeastery dip of the schists at that point.

Near the Virginia boundary of North Carolina, at the Portis and Mann-Arrington mines, the dip is southeasterly, and throughout the auriferous region of Virginia this appears to be the rule.

To the eastward and to the westward of the Carolinian belt, as well as to the northward, the prevailing dip is southeasterly. Thus this belt is marked structurally by an axis of schistosity which dies out to the northward.[1]

In the foregoing remarks the surfaces of schistose cleavage have been referred to as if they were wholly uncomplicated by other allied structures. It would have been more accurate to describe them as

[1] Much of the schist in the country to the eastward is concealed by the Newark system, but there are exposed patches, and Kerr has recorded the dips in the Reports of the Geological Survey of North Carolina, vol. 1, 1875, p. 131.

the more prominent surfaces of schistose cleavage. In almost any exposure of a few yards in area it can be shown that there are schistose partings at a large angle to the most pronounced surfaces, and very frequently spots occur in which two schistosities are about equally developed, the intersection of the two being more or less nearly horizontal, so that the strikes of each are approximately the same. Occasionally, but much more rarely, there are other schistose cleavages striking at something like a right angle to the predominant cleavage; these, however, play a small part in the structure. When there is no second schistose cleavage its place is often taken by joints which form under conditions sometimes indistinguishable from those which produce cleavage.[1]

When two slaty cleavages are distinctly developed, or when a regular system of joints clearly replaces a second cleavage, the "amount of shear" to which the mass has been subjected can be determined with an approach to accuracy. In the strain called a shear there is one direction in which there is a maximum elongation, so that a line originally of unit length attains a length α, the elongation being $\alpha-1$. In a plane at right angles to this direction there is a direction of maximum contraction, and here the line of unit length is reduced to $1/\alpha$, so that the contraction is $1-1/\alpha$. Now, what is called "the amount of shear" is the sum of the elongation and the contraction, or $\alpha-1+(1-1/\alpha)=\alpha-1/\alpha$. Where the sole deformation of the rock is such as to produce two systems of schistose partings (which do not need to be equally well developed) the mass will split into prisms with rhombic cross sections. If θ is the acute angle of this rhomb the "amount of shear" is 2 cot θ. Thus, if $\theta=84°$, the amount of shear is 0.21. It is also true that $1/\alpha=\tan(\theta/2)$, so that when $\theta=84°$, $1/\alpha=0.9$.

I have measured very many such prisms in the Southern gold fields and found more of them in which the angle in question exceeds 84° than in which it sinks below this value. Sometimes the prisms are nearly square. In supposing that the angles of the prism assign a value to the amount of shear the deformation is exaggerated. Where schistosity is produced by a simple direct pressure acting against uniform resistances, as in Daubrée's beautiful experiments,[2] there are two shears, the contractile axes of which coincide, while the axes of elongation are at right angles to each other. Even in the simplest cases to be found in the field such a second shear has probably contributed in some degree to the deformation, rendering the acute angle of the prisms more acute than they would otherwise have been.[3] For this reason I am led to the conclusion that as a rule the amount of shear is less than two-tenths, or

[1] I have discussed these structures and their relations at length in Bull. Geol. Soc. Amer., vol. 4, 1893, pp. 66 and 86.

[2] Géol. Exp., 1879, p. 319.

[3] If the ratio of the second shear is β, the unit length in the direction of greatest contraction becomes $1/\alpha\beta$. If this second shear escapes recognition, the amount of shear estimated will be $\alpha-1/\alpha\beta$, and since both β and α exceed unity this is greater than the true amount, or $\alpha-1/\alpha$.

the greatest linear compression less than one-tenth, in the schists of these gold fields. Such distortions would seem to a physicist enormous; to a geologist they appear extremely moderate, and although they accord well with Daubrée's experiments I was much surprised to find that such perfect cleavage could be induced with so little deformation.

The shearing is of course orogenically equivalent to faulting; that is to say, the same amount of warping or uplift might be accomplished either by one or more faults with a given total throw or by shearing of the same total amount unaccompanied by rupture. In the second case the movement is distributed over an infinite number of surfaces and does not reach the rupturing strain on any one.

When the amount of shear does not exceed two-tenths and the cleavage is prismatic it should be possible to determine within narrow limits the local direction of the force producing the schistosity. This force was in a plane cutting the axes of the prisms at right angles, and it very nearly bisected the obtuse angles of the rhombic cross sections. In an area like the Southern Appalachians, where (according to the results of Messrs. Willis, Hayes, Campbell, and Keith) overthrust faults and shears are far more numerous than normal deformations, the lines bisecting the obtuse angles of the prismatic cleavage prims should be nearly horizontal. No doubt in the country at large they will be found to be so. Mines are usually at points or on lines of more or less unusual character and do not fairly test general structure by themselves. I must, however, record the fact that in several cases I observed subordinate cleavage intersecting main cleavage in such a manner that a force bisecting the obtuse angle would have produced normal faulting or shearing on the main cleavage surfaces. Such instances were found at the Franklin mine, at the Boilston, and at several points in the Carolinian belt.

In the Carolinian belt, as has been mentioned, the dips are rather steep and toward the northwest. One might suppose the abnormal dips of this region to be independent of or only remotely connected with those of the surrounding country. Indeed, on the theory that slaty cleavage is due to forces at right angles to the cleavage planes, the local forces in the Carolinian belt would need to be nearly at right angles to those in the adjoining regions. I have shown that this theory is untenable, being founded substantially on the misinterpretation of Tyndall's very striking experiments.[1] Daubrée's experiments, referred to above, and my own, together with the mechanics of viscous solids, show that there should be a tendency to two cleavages at nearly 45° to the line of force, of which one will often be more pronounced than the other. It would take too much space to discuss here the circumstances determining which cleavage will be the better developed. It is sufficient to say that a relatively small irregularity in resistance would suffice to bring out one of the two associated sets of cleavage in a certain strip of country and the other set in an adjoining strip. This I

[1] Bull. Geol. Soc. Amer., vol. 4, 1893, p. 86.

believe to be the case in the Carolinian belt, but, while it accords with the information at my command, a special examination, such as I had no time for, would be needed to put the matter beyond question.[1]

When a rock is converted into slate there is an elongation in the direction of the "grain" of the slate and a contraction at right angles to the grain in the cleavage plane. If the pressure continues after the cleavage planes are developed, these planes will be thrown into undulations by further contraction and elongation. Sometimes this puckering is very close and fine, and I have taken specimens in slate quarries the surfaces of which resembled crape. More usually the undulations are on a larger scale, from an inch or two to 2 or 3 feet across. Like the ripples made by a breeze on the water, or like the ripple-marks on sand, the undulations are rarely continuous waves, and usually die out rapidly in trend, being replaced by similar mounds a little behind or in front. Such a surface may be termed a carunculated one.

When the rock converted into schist is not very uniform in its properties some portions of it will acquire schistose structure at an earlier period in the process of deformation than other portions. If the strain is carried far enough the resulting schist will show bands or sheets marked by carunculation associated with sheets in which the cleavage is flat. It seems to be in such unevenly deformed ground that fissures have opened most readily, as might be expected, and that veins are most abundant as well as widest. Carunculated surfaces are therefore properly regarded as favorable indications by the miners. At the Franklin mine such surfaces are said to be most abundant in the hanging wall; at the Kin Mori, in the foot wall; but these appear to be merely local rules.

The opening of the fissures now occupied by ore, or which afforded the ore-bearing solutions access to the spaces now occupied by impregnations, took place later than the movements which rendered the country schistose. The fact that angular fragments of schist are often inclosed in the quartz is all-sufficient proof of this statement, though by no means all that is available. While in the Georgian belt and the South Mountain area the connection between the ore deposits and the dikes is not a very close one, they appear to me to be coeval on structural grounds. Neither the ore deposits nor the dikes have been greatly disturbed since their formation. They are here and there cracked by subsequent slight movements, but not crushed, or slickensided, or faulted to any notable extent. In short, there is no sign that

[1] As I have stated that detailed observations at some of the mines indicate normal shearing which is perhaps strictly local, it is only proper to observe that the explanation offered for the westerly dips of the Carolinian belt is quite compatible with reverse faulting. If the schistose surfaces which dip easterly make an angle with the horizon of 40° and those of westerly dip an angle of 60°, each set having the same strike, the obtuse angle between them would measure 100°, and a direction bisecting this angle would dip westward at only 10°. A force in this direction would produce reverse faulting on either set of schistose cleavages. To produce normal faulting the sum of the dips of the two planes would have to fall short of 90°. These remarks, however, are merely suggestive, for the dips outside of the Carolinian belt can not be transfered to it without the careful examination of sections across the belt, undertaken with a special view to this feature.

disturbances so violent as must have accompanied the opening of the ore fissures or the opening of the dike fissures have followed the filling of either. In the Carolinian belt the connection between ores and intrusive rocks is very close and is sufficiently described elsewhere.

In a vast number of cases throughout eastern North America the fissures follow the schistose partings somewhat closely, though not accurately. This shows that there must have been a certain degree of correspondence between the forces which produced the schistosity and those which opened the fissures. Nevertheless, it can be shown that the movements were not in general identical in direction. On the schistose partings the movement which produced schistosity was at right angles to the grain of the slate or to the long axis of the undulations or of the caruncles. It is often possible to detect grooves incised during the dislocation of the schists which accompanied the opening of the fissures, and these grooves are not, as a rule, at right angles to the grain of the schists. Of course, the occurrence of veins at various angles to the schistose surfaces also demonstrates the lack of harmony between the two movements.

There are a few small faults on the veins. Several such were observed at Brindletown and at the Brackett mine. There are a considerable number at Dahlonega, and in the Carolinian belt one was noted at the Rocky River mine. These faults did not appear to me to have occurred after the deposition of ore, but before it, and they seem to indicate the direction of the movements accompanying the fissuring. They are all normal.

There is another set of phenomena which appears to indicate the direction of motion during fissuring. Where the rocks are schistose and the main ore bodies are intercalated, stringers almost always cut into the walls, and these are divisible into two classes, one steeper than the schists and the other flatter. As a rule these stringers are not straight, but sinuous, and it then appears quite practicable to ascertain whether they have been formed by normal or by reverse faulting. If the stringer is on the whole flatter than the schists, reverse faulting on the schistose plane would open up those portions of the stringer which are flattest and the walls would not undergo great disturbance by mutual opposition. On the other hand, normal faulting would bring shoulders of the fissure into opposition, and faulting could take place only by breaking up of the walls. If the average pitch of the stringer is greater than that of the schist, normal faulting may take place without disintegration of the walls, while reverse faulting can not. Furthermore, since there is greater resistance to movement in one case than in the other, steep stringers will be more abundant in connection with fissure systems opened by normal faulting, and flat stringers in those opened by reverse faulting.

Such relations as those described are illustrated in the accompanying diagram. The figure *a* shows merely a crack steeper than the schists.

In *b* this crack is opened by a normal fault, while *c* shows the sort of result to be expected from a reverse fault.

I have observed great numbers of these stringers with care and made inquiries of the miners concerning them. In both the Georgian and the Carolinian belt I found the steep stringers much more common than those which dipped at a lower average angle than the schist. These steep stringers were also opened as in *b* of the diagram. In some cases I found flat stringers with marks of great disturbance of the walls, analogous to those shown in *c*. The information I received from miners was to the same effect, and it appears to me clear that as a rule normal faulting has been the means of opening the vein fissures in those deposits which I have had an opportunity of inspecting. If, then, the general tendency in the Southern Appalachians is to overthrust movements, it was a temporary reversal of this tendency which opened the fissure system of the region.

FIG. 1.—Faulting in schists.

It is frequently objected to any purely mechanical theory of the opening of ore chambers that these sometimes exceed in size any which seem likely to be self-sustaining. Certain it is that many large chambers can not be exploited without a vast amount of artificial support. There are, however, two or three considerations to be advanced on the opposite side of this argument. When openings are formed, rock masses from the walls almost invariably fall into them, and not infrequently they wedge in such positions as to be equivalent to timbering. If such an opening fills with ore and is then mined out, these supports (perhaps already rotten) are commonly cut away. Again, at points beneath water level the immersion of the rocks in water deprives them of more than a third of their weight, which they regain when a mine is sunk and drained. These facts, however, only help to explain great ore chambers on a mechanical theory of openings. The most important consideration seems to me to be that large ore bodies are highly exceptional. If one supposes a country fissured by mechanical action, he would expect to find, perhaps, one in a hundred of the subterranean cavities so produced of unusual if not of astonishing dimensions, these cases being due to the accidental arching of rock masses. Now, the profitable ore deposits are perhaps no more than one in a hundred of those which have been discovered. Within a few miles of the famous Almaden quicksilver mine 77 points are known at which cinnabar has been found, but only a single one of these has afforded any great supply of quicksilver. So, too, in almost any region where copper and iron

sulphurets are successfully mined, there are scores, if not hundreds, of deposits too small to pay.

In regions where the ore deposits are recent, the veins ramify near the surface, as is the case, for example, at the Comstock lode. This is clearly because the surface rock is not supported by masses of overlying rock, so that relatively little work is performed in such dislocation. On the other hand, at considerable depths the pressure on the walls would be such as to crush fragments of rock or other obstacles to the closure of a fissure, although these might suffice to keep it open near the surface. At still greater depths the rock would flow, like the shales of some coal mines. Apparently, therefore, far from the original surface, veins should grow narrower; yet, if the ore was brought up from remote depths in solution, the veins must be traceable to that source.

THE GANGUE MINERALS.

The subject of the mineral association of gold is of interest, not merely because of the indications of the presence of the precious metal afforded by its habitual companions, but also because it supplies the most evident means of reaching a valid theory of the genesis of gold deposits.[1] It is clear that all the minerals which are truly undecomposed gangue minerals have been deposited from the same bodies of gas, vapor or solution as the gold itself. It is not to be forgotten, indeed, that such gases or solutions may be either mixtures or homogeneous compounds, but on the other hand this is one of the questions regarding composition which can be settled only by a study of the vein material.

With a view to contributing to this subject, the data as to gangue minerals in the Southern Appalachians have been compiled from various sources and are tabulated below. No occurrence is supposed to be included in this table excepting that of true gangue minerals. There are, however, two sources of uncertainty in this respect; an observer may either err in determination or he may so describe an occurrence as to leave it doubtful whether or no the minerals which he mentions form a part of the gangue. Thus, an excellent authority states that at a certain mine the presence of tourmaline is considered as a favorable indication, but whether this tourmaline is found in the auriferous quartz, or in barren proximate veins, or elsewhere, he does not mention. The intention has been to exclude all such uncertain cases.

Ordinary products of decomposition have been altogether omitted from the list. It is a matter of no interest whatever to know that limonite, malachite, and azurite are found near the croppings of veins

[1] The direct association of gold and diamond anywhere in the world is known in only one instance, and this has never before been described in print. Professor Arzruni showed me the specimen exhibiting it some years ago, and now gives me permission to make it known. In 1887 the Royal Polytechnic High School, at Aachen, acquired from Mr. Ernst Winter, a diamond dealer in Hamburg-Eimsbüttel, a gray, opaque, flawed, Kimberly diamond, which shows at two points inclusions of native gold in grains. It seems that this native gold must be considered as a constituent of the basic eruptive rock in which the Kimberly diamonds occur.

containing pyrite and chalcopyrite. A few decomposition products have been included on account of their rarity or their importance from an economic point of view. Some minerals, which in rocks are ordinarily secondary, are primary constituents of veins. Chlorite is in rocks almost always a decomposition product, but it seems to be an original part of the filling of certain fissures. In some cases it is questionable whether or no a mineral is primary. Analogy seems to me to indicate that stolzite is an oxidation product, but I am not aware of observations which prove such an origin for it. Where such a doubt exists the mineral is tabulated as primary.

The class of gold-quartz veins must be somewhat arbitrarily limited. Deposits which would ordinarily be classed as silver mines have not been included in the tabulation. Thus the McMakin mine in Cabarrus County, N. C., is said to have contained proustite, and it is in general evident that the entire list of silver ores may be regarded as companions of gold. The auriferous silver deposits are not included in the table. On the other hand, the Silver Hill, Silver Valley, and Emmons mines, which were auriferous, yet contained some silver and much lead, have been included. No absolute line can be drawn between gold mines containing a little galena and those which contain much.

The table is arranged alphabetically so far as minerals, mines, and counties are concerned. The States are arranged in the geographical order: Virginia, North Carolina, South Carolina, Georgia, and Alabama. The information was derived from various writers, whose names and papers are given in a footnote,[1] and from the field work done for

[1]The following is a list of the publications used in compiling the table of gangue minerals:
Adelberg and Raymond, Report on O'Neil property, Georgia, 1866.
W. R. Balch, Mines of the United States, 1882.
Booth and Garratt, Prospectus of Gold Mining Company in North Carolina, 1866.
T. M. Chatard, oral communication, 1895.
T. G. Clemson, Transactions of the Geological Society of Pennsylvania, 1835, p. 317.
Herman Credner, Neues Jahrbuch der Mineralogie, 1867, p. 442.
American Journal of Mining, passim, 1868 and 1869.
J. D. Dana, System of Mineralogy, 1892.
W. Darlington, superintendent of the Rocky River mine, oral statement to the writer.
W. B. Devereaux, Engineering and Mining Journal, vol. 31, 1881, p. 39.
M. W. Dickeson, Report of Phoenix Mining Company, 1860.
Report of Brown and Edwards property, 1860.
Report of the Rhea mine, 1860.
E. Emmons, Geology of the Midland Counties of North Carolina, 1856.
F. A. Genth, American Journal of Science, vol. 19, 1855, p, 18.
American Journal of Science, vol. 28, 1859, p. 246.
Report of the Geological Survey of North Carolina, vol. 1, 1875, appendix.
Bulletin of the United States Geological Survey No. 74, 1891.
C. T. Jackson, Report on McCullock Mining Company, 1853.
Report on Lincoln Gold Mining Company, 1854.
W. C. Kerr, Report of the Geological Survey of North Carolina, vol. 1, 1875.
Kerr and Hanna, Ores of North Carolina, 1887.
O. M. Lieber, Reports on the Geological Survey of South Carolina for 1856 and 1857.
George Little, Report on the Geological Survey of Georgia, 1874.
M. F. Maury, American Journal of Science, vol. 32, 1837, p. 325.
Orange Grove Mining Company's Report, 1847.
W. B. Phillips, Bulletin of the Geological Survey of Alabama, 1892.
C. U. Shepard, Report on Mines at Gold Hill, 1853.
American Journal of Science, vol. 27, 1859, p. 39.
M. Tuomey, Geology of South Carolina, 1848.

this reconnaissance. The authorities cited in the table, with the list of publications just mentioned, will enable the reader to pursue the subject. The alphabetical arrangement makes it easy to pick out the various minerals identified at any mine in the list, which includes most of the mines of considerable reputation. The most profitable gold mine of the region, however, does not appear. This is the Haile, in Lancaster County, S. C., which is opened on a deposit consisting substantially of an impregnation of country rock with gold, pyrite, and quartz.

Table of gangue minerals, excepting quartz and pyrite, in the gold veins of the Southern Appalachians.

(Secondary minerals are italicized.)

	Mine.	County.	State.	Authority.
ACTINOLITE	Parish	Randolph	N. C	This report.
ALBITE	Steele	Montgomery	Do	Genth, 1859.
ALLANITE	Chestatee River	Lumpkin	Ga	Shepard, 1859.
ALTAITE	King's Mountain	Gaston	N. C	Genth, 1875.
Anglesite	Silver Hill	Davidson	Do	Genth, 1875.
APATITE	Chestatee River	Lumpkin	Ga	Shepard, 1859.
ARGENTITE	Silver Hill	Davidson	N. C	Genth, 1875.
	Reynolds	Montgomery	Do	Emmons, 1856.
BARITE	Phœnix	Cabarrus	Do	Emmons, 1856.
	Rocky River	Do	Do	Darlington, 1894.
	Tucker	Do	Do	Kerr and Hanna, 1887.
	Flowe	Mecklenburg	Do	Genth, 1859.
	Lincoln	Lincoln	Ga	Jackson, 1854.
BARNHARDITE	Pioneer Mills	Cabarrus	N. C	Genth, 1875.
	Phœnix	Do	Do	Dana, 1892.
	McGinn	Mecklenburg	Do	Genth, 1875.
	Wilson	Do	Do	Genth, 1875.
BIOTITE	Valley River	Cherokee	Do	This report.
	King's Mountain	Gaston	Do	This report.
	Franklin	Cherokee	Ga	This report.
Bismite	Asbury	Gaston	N. C	Genth, 1891.
	King's Mountain	Do	Do	Genth, 1875.
	Brewer	Chesterfield	S. C	Tuomey, 1848.
BISMUTH	Brewer	Chesterfield	S. C	Tuomey, 1848.
BISMUTHINITE	Gold Hill	Rowan	N. C	Genth, 1875.
BISMUTITE	Asbury	Gaston	Do	Genth, 1891.
CALCITE	Barringer	Cabarrus	Do	Dana, 1892.
	Rocky River	Do	Do	This report.
	Hoover Hill	Davidson	Do	Genth, 1891.
	King's Mountain	Gaston	Do	Devereaux, 1881.
	Flowe	Mecklenburg	Do	Booth and Garratt, 1866.
	Steele	Montgomery	Do	Genth, 1891.
	Davis	Union	Do	This report.
	Moore	Do	Do	This report.
	Franklin	Cherokee	Ga	This report.
	Findley	Lumpkin	Do	This report.
	Field	Do	Do	Shepard, 1859.
CASSITERITE	Brewer	Chesterfield	S. C	Chatard, 1895.
Cerussite	Silver Hill	Davidson	N. C	Genth, 1891.
CHALCOPYRITE	Fr...ank Flinauquier		Va	Credner, 1869.
	Snead	Fluvanna	Do	Credner, 1869.
	Walton	Louisa	Do	Credner, 1869.
	United States	Spottsylvania	Do	Maury, 1837.
	J. C. Mills	Burke	N. C	This report.
	Bangle	Cabarrus	Do	Genth, 1859.
	Pioneer Mills	Do	Do	Emmons, 1856.

Table of gangue minerals, excepting quartz and pyrite, etc.—Continued.

	Mine.	County.	State.	Authority.
CHALCOPYRITE	Phœnix	Cabarrus	N. C	This report.
	Rocky River	Do	Do	This report.
	Tucker	Do	Do	Kerr and Hanna, 1887.
	Conrad Hill	Davidson	Do	Genth, 1891.
	Emmons	Do	Do	Genth, 1891.
	Headrick	Do	Do	Emmons, 1856.
	Silver Hill	Do	Do	Emmons, 1856.
	Silver Valley	Do	Do	This report.
	King's Mountain	Gaston	Do	Emmons, 1856.
	Gardner	Guilford	Do	Emmons, 1856.
	McCullock	Do	Do	Jackson, 1853.
	Vein Mt	McDowell	Do	This report.
	Brackett	Do	Do	This report.
	Baltimore & N. C.	Mecklenburg	Do	Kerr and Hanna, 1887.
	Capps	Do	Do	Kerr and Hanna, 1887.
	Dunn	Do	Do	Kerr and Hanna, 1887.
	Ferris	Do	Do	Kerr and Hanna, 1887.
	Flowe	Do	Do	Genth, 1859.
	Means	Do	Do	This report.
	Rhea	Do	Do	Dickeson, 1860.
	Rudisill	Do	Do	Emmons, 1856.
	Steele	Montgomery	Do	Genth, 1859.
	Cagle	Moore	Do	Kerr and Hanna, 1887.
	Clegg	Do	Do	Kerr and Hanna, 1887.
	Brown & Edwards.	Randolph	Do	Dickeson, 1860.
	Dunn's Mountain	Rowan	Do	Kerr and Hanna, 1887.
	Gold Hill	Do	Do	Emmons, 1856.
	Reimer	Do	Do	Kerr and Hanna, 1887.
	Idler	Rutherford	Do	This report.
	Lemmond	Union	Do	Kerr, 1875.
	Long	Do	Do	This report.
	Moore	Do	Do	This report.
	Stewart	Do	Do	This report.
	Brewer & Edgeworth.	Chesterfield	S. C	Lieber, 1856.
	Hagin	Lancaster	Do	Lieber, 1856.
	Potts	Do	Do	Lieber, 1856.
	Darwin	Union	Do	Lieber, 1857.
	Wilson	York	Do	Lieber, 1856.
	McDonald	Cherokee	Ga	This report.
	Kin Mori	Dawson	Do	This report.
	Lockhart	Lumpkin	Do	This report.
	Yahoola	Do	Do	This report.
	Moore Girls	Rabun	Do	This report.
CHLORITE	Valley River	Cherokee	N. C	This report.
	Emmons	Davidson	Do	This report.
	Steele	Montgomery	Do	Genth, 1859.
	Mann-Arrington	Nash	Do	This report.
	Gold Hill	Rowan	Do	Shepard, 1853.
	McDonald	Cherokee	Ga	This report.
	Field	Lumpkin	Do	Shepard, 1859.
	Lockhart	Do	Do	This report.
Chrysocolla	Pioneer Mills	Cabarrus	N. C	Genth, 1891.
	Gardner Hill	Guilford	Do	Genth, 1891.
COPPER (NATIVE)	Orange Grove	Orange	Va	Rept. Orange Grove M. Co., 1847.
COPPER-GLANCE	Pioneer Mills	Cabarrus	N. C	Genth, 1891.
	Silver Hill	Davidson	Do	Genth, 1891.
	Phœnix	Guilford	Do	Dickeson, 1860.
Covellite	Brewer	Chesterfield	S. C	This report.
Cuprite	McGinn	Mecklenburg	N. C	Genth, 1891.
	Hodge's Hill	Rowan	Do	Emmons, 1856.
ENARGITE	Brewer	Chesterfield	S. C	Lieber, 1856.
EPIDOTE	Valley River	Cherokee	N. C	This report.
	Moore	Union	Do	This report.

Table of gangue minerals, excepting quartz and pyrite, etc.—Continued.

	Mine.	County.	State.	Authority.
FLUORITE	King's Mountain	Gaston	N. C.	Devereaux, 1881.
GALENA	Snead	Fluvanna	Va	Credner, 1869.
	Walton	Louisa	Do	Credner, 1869.
	United States	Spottsylvania	Do	Maury, 1837.
	Eagle	Stafford	Do	Credner, 1868.
	Rappahannock	Do	Do	Clemson, 1835.
	Rocky River	Cabarrus	N. C.	This report.
	Emmons	Davidson	Do	This report.
	Silver Hill	Do	Do	Genth, 1875.
	Silver Valley	Do	Do	This report.
	Cansler & Shuford.	Gaston	Do	Genth, 1891.
	King's Mountain	Do	Do	Emmons, 1856.
	Boilston	Henderson	Do	This report.
	Brackett	McDowell	Do	This report.
	Vein Mountain	Do	Do	This report.
	Steele	Montgomery	Do	Genth, 1859.
	Conrad Hill	Rowan	Do	Balch, 1882.
	Davis	Union	Do	Kerr and Hanna, 1887.
	Hemby	Do	Do	Kerr and Hanna, 1887.
	Lemmond	Do	Do	Kerr, 1875.
	Lewis	Do	Do	Kerr and Hanna, 1887.
	Long	Do	Do	Genth, 1891.
	Moore	Do	Do	Genth, 1891.
	Phifer	Do	Do	Genth, 1891.
	Smart	Do	Do	Genth, 1891.
	Stewart	Do	Do	Genth, 1891.
	Dorne	Abbeville	S. C.	Dana, 1892.
	Parson's Mountain.	Do	Do	Tuomey, 1848.
	Brewer & Edgeworth.	Chesterfield	Do	Lieber, 1856.
	Potts	Lancaster	Do	Lieber, 1856.
	O'Neil	Cobb	Ga.	Adelberg and Raymond, 1866.
	Findley	Lumpkin	Do	This report.
GARNET	Findley	Do	Do	This report.
	Field	Do	Do	Credner, 1867.
	Lockhart	Do	Do	This report.
	Hedwig	Do	Do	This report.
	Lumsden	White	Do	This report.
Hematite	Dunn	Mecklenburg	N. C.	Emmons, 1856.
ILMENITE	Fisher Hill	Guilford	Do	Genth, 1891.
	Field	Lumpkin	Ga.	Shepard, 1859.
LEUCOPYRITE	Asbury	Gaston	N. C.	Genth, 1875.
Magnetite	Gold Hill	Rowan	Do	Shepard, 1853.
MARCASITE	Fisher Hill	Do	Do	Emmons, 1856.
Melaconite	Silver Hill	Davidson	Do	Genth, 1875.
	McGinn	Mecklenburg	Do	Genth, 1875.
	Gold Hill	Rowan	Do	Shepard, 1853.
MISPICKEL	Melville	Spottsylvania	Va	Credner, 1868.
	Barringer	Cabarrus	N. C.	Genth, 1875.
	Allen	Davidson	Do	Dana, 1892.
	Gold Hill	Do	Do	Genth, 1875.
	Asbury	Gaston	Do	Genth, 1875.
	King's Mountain	Do	Do	Devereaux, 1881.
	Long Creek	Stanley	Do	Emmons, 1856.
	Lemmond	Union	Do	Genth, 1875.
	Stewart	Do	Do	Genth, 1875.
	Dr. Charles	Cherokee	Ga.	This report.
	Sixes	Do	Do	Credner, 1867.
	Kin Mori	Dawson	Do	This report.
	Findley	Lumpkin	Ga.	This report.
	Jones's Pit	Tallapoosa	Ala.	Phillips, 1892.
MOLYBDENITE	Pioneer Mills	Mecklenburg	N. C.	Genth, 1875.

Table of gangue minerals, excepting quartz and pyrite, etc.—Continued.

	Mine.	County.	State.	Authority.
MUSCOVITE	Brackett	McDowell	N. C	This report.
	Franklin	Cherokee	Ga	This report.
	Kin Mori	Dawson	Do	This report.
	Barlow	Lumpkin	Do	This report.
	Battle Branch	Do	Do	This report.
	Field	Do	Do	Credner, 1867.
NAGYAGITE	King's Mountain	Gaston	N. C	Devereaux, 1881.
	Carter	Montgomery	Do	Emmons, 1856.
ORTHOCLASE	Silver Hill	Davidson	Do	Genth, 1875.
	Steele	Montgomery	Do	Genth, 1859.
Pyrolusite	Beck	Gaston	Do	Genth, 1891.
	Hodge's Hill	Rowan	Do	Emmons, 1856.
	Johnson	Lancaster	S. C	Lieber, 1856.
PYROMORPHITE	Snead	Fluvanna	Va	Credner, 1869.
	United States	Spottsylvania	Do	Maury, 1837.
	Silver Hill	Davidson	N. C	Genth, 1875.
	Silver Valley	Do	Do	Genth, 1875.
	Vein Mountain	McDowell	Do	This report.
	Stewart	Union	Do	Genth, 1875.
	Dorne	Abbeville	S. C	Dana, 1892.
	Parson's Mountain	Do	Do	Tuomey, 1848.
PYRRHOTITE	Asbury	Gaston	N. C	Genth, 1875.
	King's Mountain	Do	Do	Devereaux, 1881.
	Reimer	Rowan	Do	Kerr and Hanna, 1887.
	Field	Lumpkin	Ga	Shepard, 1859.
RHODOCHROSITE	Flowe	Mecklenburg	N. C	Booth and Garratt, 1866.
Scorodite	Ludwick	Cabarrus	Do	Dana, 1892.
Scheelite	Bangle	Do	Do	Genth, 1859.
	Cullen	Do	Do	Dana, 1892.
	Flowe	Mecklenburg	Do	Genth, 1859.
	Gold Hill	Rowan	Do	Shepard, 1853.
SIDERITE	Phœnix	Cabarrus	Do	This report.
	Conrad Hill	Davidson	Do	Genth, 1891.
	Silver Valley	Do	Do	This report.
	Flowe	Mecklenburg	Do	Genth, 1859.
	Rudisill	Do	Do	This report.
	Hodge's Hill	Rowan	Do	Emmons, 1856.
	Moore	Union	Do	This report.
	Barlow	Lumpkin	Ga	This report.
	Field	Do	Do	Credner, 1867.
SILVER (NATIVE)	Silver Hill	Davidson	N. C	Genth, 1875.
SPHENE	Steele	Montgomery	Do	Genth, 1859.
STOLZITE	Silver Hill	Davidson	Do	Genth, 1891.
SYLVANITE	Reynolds	Montgomery	Do	Emmons, 1856.
TELLURIUM	Tellurium	Fluvanna	Va	Credner, 1868.
TETRADYMITE	Tellurium	Do	Do	Genth, 1859.
	Boger	Cabarrus	N. C	Genth, 1875.
	Cullen	Do	Do	Genth, 1875.
	Phœnix	Do	Do	Genth, 1875.
	J. C. Mills	Burke	Do	Genth, 1875.
	Allen	Davidson	Do	Genth, 1891.
	Beck	Do	Do	Genth, 1875.
	Asbury	Gaston	Do	Genth, 1891.
	Kirksey	McDowell	Do	Genth, 1875.
	Gold Hill	Rowan	Do	Shepard, 1853.
	Field	Lumpkin	Ga	Shepard, 1859.
	Drake	Polk	Do	Little, 1874.
TETRAHEDRITE	Eldridge	Buckingham	Va	Genth, 1855.
	Ludwick	Cabarrus	N. C	Dana, 1892.
	King's Mountain	Gaston	Do	Devereaux, 1881.
TOURMALINE	United States	Spottsylvania	Va	Maury, 1837.
	Calhoun	Pickens	S. C	Tuomey, 1848.
	Hedwig	Lumpkin	Ga	This report.

Table of gangue minerals, excepting quartz and pyrite, etc.—Continued.

	Mine.	County.	State.	Authority.
VANADINITE	United States	Spottsylvania	Va	Maury, 1837.
Wavellite	Silver Hill	Davidson	N. C	Genth, 1875.
Wolfram	Flowe	Mecklenburg	Do	Genth, 1859.
ZINC-BLENDE	Walton	Louisa	Va	Credner, 1869.
	United States	Spottsylvania	Do	Maury, 1837.
	Rocky River	Cabarrus	N. C	This report.
	Emmons	Davidson	Do	This report.
	Silver Hill	Do	Do	Genth, 1891.
	Silver Valley	Do	Do	Genth, 1891.
	King's Mountain	Gaston	Do	Devereaux, 1881.
	Brackett	McDowell	Do	This report.
	Vein Mountain	Do	Do	This report.
	Steele	Montgomery	Do	Genth, 1859.
	Lemmond	Union	Do	Kerr, 1875.
	Long	Do	Do	Genth, 1891.
	Moore	Do	Do	Genth, 1891.
	Smart	Do	Do	Genth, 1891.
	Stewart	Do	Do	Genth, 1891.

The tabulated data require some slight comment. A mass of a fibrous mineral carrying free gold was shown me by Mr. Richard Eames, jr., in Salisbury. This, as he assured me, came from the Parish mine. When I visited the mine almost nothing was to be seen on the grass-grown dumps, and I could find none of this peculiar ore. A slide from a specimen given me by Mr. Eames shows much beautiful fresh actinolite in a groundmass of a fibrous material which suggests anthophyllite. There is also a small amount of epidote in the slide. This strange ore may be compared with some of the ores at Ducktown, Tenn. There chalcopyrite, pyrite, pyrrhotite, and garnet occur crystallized with actinolite, but the Ducktown ores are reported as showing a mere trace of gold. Albite carrying gold from the Winter's vein, Calaveras County, Cal, is noted by Genth in the same paper quoted in the table. Mr. H. W. Turner has also described this association from the Shaw lode, 4 miles southwest of Placerville, Eldorado County, Cal.,[1] and there can be no question of the reality of this association.

Allanite and apatite have been observed in auriferous quartz, so far as I know, only by Shepard. His statement is most distinct, and he remarks on the rarity of apatite. I can not rid myself of the belief that these minerals were really fragments from the gneiss walls of the quartz vein in which they were found.—Barite has been found associated with gold in California as well as in North Carolina. At the Phœnix mine, North Carolina, heavy spar often forms a very large part of the ore.—Biotite of a greenish tinge is not uncommon in the ore of the Franklin mine. It is very possible that some of the colorless micas or micaceous minerals found in ores are colorless biotite or bleached biotite. Of this more will be said under the head of muscovite.—Bismuth compounds have been detected at four mines. Bismuthinite is also found in some of the Bolivian mines.—Calcite is noted in no less than eleven of the Southern gold mines. It is usually very subordinate to quartz

[1] Amer. Jour. Sci., vol. 47, 1894, p. 470.

and is generally less intimately associated with gold. In the King's Mountain mine the country rock is mainly limestone, and calcite is extremely abundant. Even there, however, there are stringers of auriferous quartz in the calcareous mass. Calcite is known as a gangue mineral accompanying gold in Nova Scotia and in California.—Mr. Chatard, who was at one time superintendent of the Brewer, informs me that cassiterite was most intimately associated with the gold in portions of the mine.—Pyrophyllite was also found in the mine but not, as I understand, in immediate contact with gold.—Chalcopyrite is, next to pyrite, the most frequent metallic gangue mineral. Its decomposition yields the sulphate of copper; for example, at the King's Mountain mine, covellite (Brewer mine), chrysocolla (Pioneer Mills), malaconite (Silver Hill), and other products.—Copper glance is naturally more rare than chalcopyrite, since all the mines contain in abundance iron sulphide, with which copper sulphide usually unites.—Covellite has not, I believe, been hitherto reported from the Brewer. A chemical examination was made to ascertain that the mineral was a sulphide of copper without arsenic.—Enargite may be regarded roughly as a mispickel without iron, and, like copper-glance, is rare, because iron is so plentiful.—Epidote as a vein mineral is unimportant, and is probably derived from the decomposition of the wall rocks during the deposition of the ores.—Fluorite is rare in gold veins proper, but common enough in lead and copper mines. In the Southern gold mines it is found only at the Kings Mountain, which is an exceptional locality for minerals.[1]

Galena occurs in the South about half as frequently as chalcopyrite, and is more often met with than mispickel or zinc blende. Anglesite and cerussite are for the most part decomposition products of galena. Galena sometimes alters to pyromorphite, but pyromorphite sometimes changes to galena. I suspect that in the cases in which pyromorphite is noted in this paper galena was the original mineral.

The occurrence of garnet as an auriferous gangue mineral near Dahlonega and Nacoochee seems to me of some importance and much interest. It was first noted by Credner at a locality which I suppose to be identical with the Field mine, on the Chestatee River, 2½ miles easterly from Dahlonega. In two of the cases tabulated the garnets are auriferous but are not found in veins. Further notes on the subject will be found in this report in the description of the region in question. It is suggestive that ore deposition and ordinary metamorphism are both sometimes attended by the formation of garnets.

Magnetite is reported at only one mine. There is also one instance of hematite and two of ilmenite. I am not prepared to admit that hematite and magnetite are primary gangue minerals in auriferous quartz veins. On the contrary, as Mr. Lindgren has pointed out to me, one of the usual effects of ore-bearing solutions on the wall rocks is to

[1] Mr. R. A. F. Penrose informs me that fluorite occurs abundantly as a gangue mineral in the auriferous quartz veins of Cripple Creek, Colorado.

destroy the magnetite. It is also well known that hematite and magnetite are ordinary secondary products. Solfataric action also causes the disappearance of ilmenite, but as ilmenite has not to my knowledge been recognized as a secondary mineral it is left in the list, with much doubt, as primary.—Marcasite has been identified at only one of the Southern mines. It occurs at a gold vein near Grass Valley, in California, and the marcasite from the Baker quicksilver mine in that State is auriferous.[1] Secondary marcasite is common in the auriferous gravels of California, yet the circumstances under which it forms must be peculiar, for it has not been reproduced artificially. It is certainly an unusual companion of gold in veins. Mispickel is about as common in the veins as is zinc blende. The occurrences are widely scattered and seem to present nothing particularly noteworthy.

Colorless mica has been observed in the ores at a number of points. In the ore of the Franklin mine and of the Barlow mine some of the mica exhibits the wide divergence of the optical axes characteristic of muscovite; and that of the Brackett mine, as seen in slides, seems to have the optical properties of muscovite. It is possible that some cases of white mica in the ores represent bleached or colorless biotite.

The tellurides, nagyagite and tetradymite, and native tellurium have a wide distribution, but fortunately are nowhere present in important quantities.

Manganese ores are uncommon in the fresh vein material, but in the decomposed zone above water level black stains, which are seemingly psilomelane or wad, are extremely common. They sometimes assume a dendritic character. The carbonate, rhodochrosite, is reported from only a single locality.—Pyrrhotite is a mineral of some interest, because it appears to form a link between the gold veins and the copper-sulphur mines, such as those of Ducktown. In the Armenius mine, in Virginia, where pyrrhotite forms a large part of the sulphur ore, there are stringers of auriferous quartz.—Siderite is not rare as a gangue mineral, and is peculiarly abundant at the Phœnix mine. I have seen a large mass of siderite ore said to have come from the Silver Valley.

Tetrahedrite is rare in the Southern gold mines. Genth believes it to exist in the ores of Silver Hill, as these sometimes give a reaction for antimony. No other antimonial mineral has been recorded from the Southern gold mines, while in Australia and the Transvaal stibnite is often found with gold.—Tourmaline is noted in a few cases only. Oral reports have reached me that the tourmaline-bearing quartz veins at the tin mine on King's Mountain are auriferous.—Zinc blende is a fairly common mineral, excepting in the north Georgian mines, from which it has not been reported.

The gold ores of the South are quartzose deposits with very subordinate admixtures of carbonates in which pyrite is always present, while chalcopyrite is common, and galena, mispickel, and zinc blende

[1] Mon. U. S. Geol. Survey, Vol. XIII, 1888, p. 368.

are by no means rare. The long list of other minerals found in the veins is unimportant, excepting in so far as it assists in elucidating the genesis of the ores. I am unable to see that the accompanying minerals, with the one exception of pyrite, serve in any way as an indication of the value or extent of the ore bodies.

Precisely these statements would apply to almost any of the great gold regions of the world, so far as I know them; and it may therefore be asserted that the gold ores of the South are of a thoroughly typical character.

THE VEINS AND IMPREGNATIONS.

A very large part of the auriferous quartz deposits of eastern North America exhibits at least approximate conformity to the structure of the wall rocks. This fact has received different explanations from observers. In 1835 Messrs. T. G. Clemson and R. C. Taylor pronounced these quartz masses in the Virginia gold regions contemporaneous with the formations in which they occur.[1] In 1836 W. B. Rogers pointed out that, although in the main the dip and strike of the veins conform with those of the inclosing strata, the correspondence is far from being exact, and he classed them as true veins of injection.[2] In 1837 Silliman dissented from Rogers and pronounced those auriferous quartz deposits in Virginia which he had examined beds.[3] In 1854 Prof. J. D. Whitney classed the deposits of North Carolina as veins, but seemingly as "segregated" veins, and this kind of deposit he esteemed as originating in the gradual elimination of the component particles from the surrounding formation.[4] In his later works, however, this geologist regarded the similar deposits of California as what Rogers would have called veins of injection.[5] E. Emmons, in 1856, supposed the gold of the impregnated slates a sediment, and contemporaneous with the rock, but he perceived that the quartz masses are only in approximate conformity with the slates, and that they are real veins.[6] O. M. Lieber, in 1859, announced that the gold is contemporaneous with the rocks, but that its segregation took place at a later time.[7] Prof. Herman Credner, in 1867, called the deposits in question "beds" and "primary deposits," "true veins," he thought, being foreign to the schists of the Southern Appalachians.[8] In 1875 W. C. Kerr wrote: "Many of these quartz veins are in reality beds, as they coincide in dip and strike with the stratification, whilst an equally great number run in every conceivable direction and dip just as irregularly."[9] In 1884 J. A. Phillips referred to these deposits as segregated veins, but he uses this term

[1] Trans. Geol. Soc. Penn., vol. 1, 1835, p. 310.
[2] Rept. Geol. Recon. Va., 1836.
[3] Amer. Jour. Sci., vol. 32, 1837, p. 100.
[4] Met. Wealth U. S., 1854, pp. 129, 83, 45.
[5] Auriferous Gravels, 1880, p. 330.
[6] Geol. Midland Counties of N. C., 1856, pp. 130, 142.
[7] Proc. Amer. Assoc. Adv. Sci., vol. 12, 1859, p. 229.
[8] Neues Jahrbuch der Min., 1867, p. 442.
[9] Geol. N. C., vol. 1, 1875, p. 285.

as equivalent to bedded veins, and doubts there being any difference excepting that of position between these and so-called "true" veins.[1]

The veins of Nova Scotia have been similarly interpreted. Sterry Hunt and Professor Hind thought them sediments, while Messrs. Campbell, Selwyn, and Poole took the opposite view, as will appear later in this report.

Rogers and Campbell appear to me to have been perfectly correct in their views, and it is difficult to understand that when the evidence they offered was once known any different opinion could have been adopted by subsequent observers. It is true that a quartz seam will sometimes follow a schistose parting or a slaty cleavage quite accurately for a few feet, or even for some yards; but I have met with no reasonably large exposure in which it did not appear that the quartz breaks across at least from one cleavage to a parallel surface, and usually such evidences are abundant. Furthermore, stringers diverging from the main quartz bodies into the walls are frequent, and angular fragments of schist can generally be found completely embedded in the quartz, showing beyond a question that rupture of the country rock preceded the deposition of ore. Occasionally also comb structure is visible in conformable veins, and, where the veins pinch, as these veins do with remarkable frequency, the walls are often scored by the motion which resulted in the formation of the openings now filled with quartz.

The structure with which the quartz veins under discussion are approximately conformable is not stratification, but schistose cleavage. In most cases the rocks are of igneous origin, and although there are instances in which the material is sedimentary, it is none the less an accident when the bedding and the cleavage coincide. There is certainly nothing remarkable in the fact that a schist subjected to orogenic dislocation should very often split along its cleavage surfaces. It is this very property which gives the rock its name.

The wall rocks in the Southern Appalachians were for the most part rendered schistose by forces antedating the fissure-forming disturbances and wholly independent of them. The pressures which opened the vein fissures did not in general coincide in direction with those which had previously produced schistosity. In the Georgian belt the effect of the later disturbance was usually to split the slaty rocks along their main cleavage and to dislocate the walls. The cleavage surfaces of the rocks were not planes, but surfaces crossed by undulations of more than one system, and the result of the dislocation was to produce lens-like openings, or pipes with lens-shaped cross sections. In such openings the quartz was deposited, and the mass is often corrugated like the "barrel quartz" of Nova Scotia.

It rarely happens in any mineral region that isolated fissures are formed. In the Georgian belt the tendency to the distribution of motion over various surfaces is very marked, and, as a rule, a mine

[1] Ore Deposits, 1884, p. 90. On p. 61 he refers to his own observations in the Carolinas.

opening displays many associated small fissures, each bearing lenticular quartz masses, the whole system forming what may conveniently be called a *stringer lead*. Such leads are known in Georgia as veins, the use of this term being to a slight extent excusable because the entire lead is mined and treated as ore.[1] The undulatory character of the cleavage is so strongly marked a feature of the rock structure as to impress itself on an entire deposit or any small portion of it. One may collect hand specimens of ore showing the lenticular structure. The mine stopes show at a glance the same lenticular shape on a larger scale, and sometimes it seems that the entire workable ground of a mine is also a lens.

Very often the lenticular stringers are discontinuous. One such stringer dwindles to a thread or disappears and is replaced by another, or by others, in the foot or hanging. In many instances it can be seen that diagonal seams connect such shingling (or more scientifically, imbricating) stringers. Often no such connection is visible in the section which happens to be exposed, but it does not follow that a different exposure would not show a connecting seam. Indeed, the fact that they are often visible, together with simple considerations on the origin of the fractures, points to the conclusion that all the stringers were once united by cracks sufficiently large to permit the passage of solutions. I have formerly employed the term "linked veins" to designate similarly connected groups of veins.[2]

Besides the stringer leads, coinciding on the whole but not in detail with the chief schistose cleavage of the country, there are in the Georgian gold belt many relatively small cross fissures. These answer to joints in the country rock, originally formed as a part of the dynamic effects, among which schistose cleavage is the most prominent. In many cases these joints gaped when the schists were split to receive the ore. In a few cases it seems to me that the joints have yawned in response to later movements of the country, and have then received a somewhat different filling, usually calcite. I have not been able to ascertain that there is any characteristic difference in the tenor of the main deposits and the cross stringers when both are filled with quartz. In the Franklin mine there are cross stringers filled with calcite, carrying, I was informed, a mere trace of metal.

Throughout the South the veins are very frequently attended by impregnations of the country rock, the gold, accompanied by pyrite, permeating the walls to a depth of from a few inches to a few feet. Such impregnations occur also with veins of tin ore.[3] When the walls are rich enough, of course the rock is mined, and sometimes the walls are worth more than the vein.

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[1] *Lead* is a variant of *lode*, and means a deposit which, though not a stratum, is bounded by more or less definite walls. It is in use to some extent in Nova Scotia to denote zones of auriferous quartz seams. I understand that in Australia it is applied to a pay streak in gravel. It seems the only word indefinite enough to be applied to these groups of stringers. *Belt* would be available did it not suggest a wide zone of country, such as the gold belt of California.

[2] Mon. U. S. Geol. Survey, Vol. XIII, 1888, p. 409.

[3] J. A. Phillips, Ore Deposits, 1884, p. 96.

In the South Mountain area the veins are of an altogether different type from those of the Georgian belt. Their strike is more easterly by 30° or 40°, ranging about N. 50° E. to N. 70° E. The strike of the schistosity in this area is very irregular, but is usually to the west of north. Thus the South Mountain veins cut across the schists. They form a system of parallel fractures which is absolutely astonishing in its regularity when the heterogeneity of the country is considered. The variations in lithological character and in structure of the country seem without any sensible effect whatever on these sharply-defined fissures. The dip of the schistose surfaces is to the northeastward, while the veins dip northwestward at about 80°. Most of the veins in this area are very thin, though not so tenuous as some of the seams in the stringer belts of Georgia. Veins only half an inch in thickness are common, and, small as they are, it seems possible to follow them as far as may be worth while. Oftentimes several small veins are found within a horizontal distance of a few feet and can be worked in the soft superficial layer at the same time; more usually, however, veins thick enough to pay even the expense of trenching in the saprolite[1] are a rod or two apart.

There seems to be a tendency to regularity in the distribution of the larger veins. Thus some 5 miles north of Rutherfordton there is a group of veins of 1 or 2 feet in thickness, including those of the Idler property. To the northward of this group is another, including those of the Vein Mountain mining property, at a distance of several miles from that first mentioned. After another interval of a few miles is a third group of similar lodes, including the Neighbor's vein. Between these groups there seem to be literally innumerable veins of small size parallel to the larger ones, and equally persistent. Such relations are well worth noting for practical purposes, as well as for their theoretical bearing, but it must not be inferred that groups of larger veins will be distributed at equal distances. If there is, as I suspect, a rhythm in the distribution of the larger veins, it probably follows a complex law, like that of ocean billows.

The veins of the South Mountain region, being clean-cut fissures, are very free from horse matter, which, however, is sometimes met with. They are substantially quartz veins, with a little calcite, carrying, besides gold and pyrite, chalcopyrite, galena, and zinc blende in small quantities. There seems no reason why the larger veins should not pay if they carry over $3 per ton. The small veins can not be worked below water level unless found in groups so close as to permit of simultaneous exposure.

In this same region there are some irregular streaks of glassy quartz, coinciding in strike and dip with the schistose rocks. So far as I know, they are of small thickness and soon fade out in strike. They seem to be mere local segregations of silica and are not known to be auriferous.

[1] *Saprolite* is used in this paper to signify thoroughly decomposed rock in place. The word is more fully explained in the section on Placers, p. 43.

No miner would think of testing this unpromising material for gold. They seem in no way related to the auriferous quartz veins or stringer belts intercalated in the schists of the other gold-bearing regions. In all the Southern gold regions there are many quartz veins which carry little or no gold, and the wide, solidly filled transverse veins are particularly apt to be barren. In almost all cases the quartz of these veins looks unpromising, being either glassy or milky. It is very possible that these veins are of a different age from those which carry gold, but they have not been carefully studied as yet.

In the Carolinian belt stringer leads entirely like those of Georgia are by no means uncommon. This area, however, possesses deposits of another kind which bear much resemblance to the *fahlbands* of Norway.[1] Extensive lens-shaped masses of rock conformable to the general schistose structure of the country are charged with disseminated pyrite and gold. In and close to these ore bodies there are quartz stringers grouped as in the stringer leads of Georgia, but these form a relatively unimportant portion of the ore. The auriferous schists also show effects of dislocation, such as grooving. At the Haile mine well-developed quartz veins appear close to the enriched rock masses, but these veins are barren. The mineralization of the auriferous masses is curiously irregular. Sometimes the gold and pyrite are accompanied by so little silica that the impregnated schists are easily cut with a knife, and occasionally gold spangles appear on cleavage planes without any visible quartz. I have not been able to satisfy myself, however, that any of the deposits are absolutely devoid of gangue quartz. This mineral is to be found in almost all cases within a few millimeters of any gold particle, even when not in contact with it, and the microscope shows a very curious association of pyrite with fibrous silica in the slate ores. Oftentimes these deposits are highly silicified, and the ore is then a hornstone-like mass. There seems to be no relation between the intensity of silicification and the value of the ore.

It seems to me that these deposits are impregnations dependent in great part upon the lithological character of the rock for their existence. The frequent occurrence in them of stringer-lead structure and evidences of dislocation indicates that the whole mass has been shaken up and its texture loosened. If in such a mass the rock itself is porous or peculiarly susceptible to chemical change, it is evident that ore-bearing solutions might easily impregnate the whole body. Now, along the Carolinian belt there are unquestionably great quantities of volcanic material, and such material, through its heterogeneity, would tend to irregular rupture. Fragmental eruptives are also commonly porous and of no great chemical stability.

In some instances it seems certain that the impregnated rock is eruptive. This is the case at the Brewer and the Haile, in South

[1]Compare M. Kjérulf's account of fahlbands as reported in Fuchs and DeLaunay, Gîtes minéreaux, vol. 2, 1893, p. 759.

Carolina, and at the Hoover Hill, in North Carolina. At the Davis and the Russell mines, in the latter State, it seems probable that the impregnated mass is eruptive. There are other cases in which only prolonged and detailed study of the localities could decide the origin of the rock.

A peculiar case is the Moratock. There is no question that the rock upon which this mine is opened is eruptive. It is a spherulitic mass showing flow structure and containing phenocrysts of quartz, labradorite, and biotite. Portions of the rock are plainly breccia. It is not greatly decomposed, but contains scattered pyrite crystals, sometimes lining minute geodes. The attempt to work this rock as ore was a failure, though I was informed that it carried a very little gold. This was probably in the pyrite. Whether the pyrite was secondary or primary I am not sure; but I could perceive no evidence that it had been introduced into the mass after solidification.

The dependence of ore deposition upon intrusive rocks is not clear or satisfactory in the Georgian belt. There are numerous granitic dikes near Nacoochee, and they appear at the Loud mine. At no great distance from the Franklin mine, also, such dikes are abundant. In the neighborhood of Dahlonega it is curiously difficult to decide whether or no there are dikes. The gneiss is there remarkably well banded, and there are places in which one suspects dikes among the bands, but I could not find any single case of a clearly marked intrusion. At the Boilston mine, in North Carolina, on the other hand, a granite dike accompanies the veins and appears closely connected with ore deposition.

The age of the dikes mentioned can hardly be greater than that of the ore bodies, for the disturbance of the country preceding the deposition of ore would have affected the dikes, and there is no evidence of their having been thus disturbed. The ore bodies, however, have not been considerably faulted; and in short there seems no evidence of any profound dislocation since the time to which both ore and dikes are referable. Nevertheless, only experience got in other regions justifies the hypothesis that a genetic relation exists between the ores and the granite dikes of the Georgian belt, excepting in the case of the Boilston mine.

In the South Mountain region there are also granite dikes, but they are few in number. They do not strike with the veins, and in one case (the Brackett mine) a dike is said to fault the vein.

In the Carolinian belt, on the other hand, the connection between volcanic phenomena and ore deposition is very clear at some points. At the Haile mine, for example, a system of heavy diabase dikes intersects the country. These dikes are somewhat decomposed in contact with the ore, but themselves carry little or no gold. The ore bodies are found along the dikes and are richest close to them. At the Howie there are both diabase and diorite dikes, but the mine being closed the

exact relations to ore can not be determined. In the Ferris mine a granitic dike exists in contact with the ore. At the Reed and the Phœnix there are large quantities of porphyrite, and there is a dike at Hoover Hill in the mine workings.

Many instances of the association of dikes with gold deposits are also mentioned in the reports of Tuomey, Lieber, and Emmons as occurring in Alabama, South Carolina, and North Carolina. In considering the connection between dikes and deposits it should be remembered that (as stated in the description of rocks in this report) there were Mesozoic intrusions as well as earlier ones. The later dikes are probably far younger than the ore, and of course without influence on its genesis.

The whole subject of the relation of intrusive or eruptive rocks to ores is in a very unsatisfactory condition. Most mining geologists believe in a direct or indirect connection between vulcanism and ore deposition, but the nature of this connection has not been elucidated. I am inclined to suppose the intrusion of lava and the formation of ore-bearing solutions two distinct effects of vulcanism, which may be associated or dissociated.

A special effort was made during the reconnaissance described in this report to gather any evidence which might exist of the substitution of ore for country rock. So far as the veins were concerned, this effort was a total failure. One of the chief physical indications of replacement is the rounding of the edges and corners of unchanged kernels of the material which undergoes replacement when the process is incomplete. This is in consequence of the fact that edges and corners expose a greater surface per unit volume of the mass than do flat surfaces. It follows that fissures will be irregularly enlarged and that replacement will take place in cuspoid forms along joints intersecting main fissures. Nothing of the kind was met with in the veins, and the total absence of such phenomena is valid evidence that the auriferous veins occupy spaces opened by purely mechanical action.

With respect to the impregnations, it is more difficult to judge what has happened. That profound alteration has taken place there is no doubt. Pyrite crystals have grown to most perfect development, as if in a fluid, in spite of the pressure of the rock mass, and have even bent adjacent laminæ of slates; quartz grains, too, have developed. Whether, however, rock constituents have been dissolved as a condition of the precipitation of quartz and pyrite accompanied by gold, is uncertain. I suspect not.

The association of minerals in the veins, among them carbonates and chlorite, indicates that the ore was deposited from solutions and not from gases or vapors. It is true that there is a very close analogy between the chemical behavior of gases and dilute solutions, but the physical state of the unprecipitated ore is a matter of importance.

The character of the solutions from which the ore was deposited is still a matter of doubt. I showed in 1887 that silica, gold, pyrite, and the sulphides of arsenic, antimony, copper, zinc, and iron are soluble in a menstruum common in nature, viz, waters containing carbonates and sulphides of the alkalies. That is a satisfactory result so far as it goes, but this solvent will not dissolve galena under any conditions known to me, while galena is a common mineral in gold veins. Either, then, lead sulphide is soluble in this menstruum under conditions still unknown, or the right natural solvent has not been experimented with. The recent deposits of Steamboat Springs, Nevada, contain lead as well as copper, gold, etc., and the water flowing from the springs contains carbonates and sulpho-salts of the alkalies, chlorides of the alkalies, borax, and sodium silicate.[1] It would seem, therefore, that my solvent must have been closely analogous to that which comes in play at Steamboat. Galena has, indeed, been formed artificially in several ways from lead compounds, but the mere generation of crystals of the sulphides from other compounds in place implies only an infinitesimal solubility. To explain ore deposits one must find a probable menstruum which will hold in solution sensible quantities of lead sulphide and from which it can be precipitated under known conditions.

To discuss the origin of the gold in the South it would be needful to make very laborious analyses of large quantities of the freshest gniesses of the region. This has not been done. Should they prove auriferous, it would be reasonable to infer that the gneissic rocks are the source of the gold. The indications of the occurrences do not seem favorable to the hypothesis of such an origin, for there is no such prevalence of solfataric decomposition of the wall rocks below water line as would probably accompany a gathering together into the veins of small quantities of gold from great masses of rock.

The question of the persistency of the veins in depth is one which, in my opinion, need cause no uneasiness. For reasons stated elsewhere in this report, it is believed that the veins date chiefly from a pre-Cambrian period, and if so, the present croppings are far below the original ones. If mining could be carried to an unlimited depth, it is probable that the fissures would be found to grow smaller, for the greater the pressure of the superincumbent mass the greater must have been the tendency to close openings formed under catastrophic conditions; but the total depth of fissures measured from the original surface is most likely of the same order as their length, several miles in many cases, while no mine has ever yet reached a depth of one mile. In sinking, it should not be forgotten that veins may imbricate in a vertical as well as in a horizontal direction, and that crosscutting is, therefore, a very essential feature of development.

[1] Am. Jour. Sci., vol. 33, 1887, p. 199, and Mon. U. S. Geol. Survey, Vol. XIII. 1888, pp. 344, 349, 433.

It has been held that the precipitation of gold took place mostly near the original surface,[1] but if the veins of the Southern Appalachians are, as they seem to me, of pre-Cambrian age, this can not be strictly true, nor does it seem to me that the mining operations of the last thirty years point to such a conclusion. Doubtless some veins grow poorer in depth, while some grow richer. These variations within accessible limits of depth are probably controlled for the most part by circumstances similar to those which bring about variations in tenor from point to point on the strike of veins.

An idea is very prevalent among mine owners that veins may be expected as a rule to grow stronger and richer with depth. This is an hypothesis based on hope and with no justification in general experience.

PLACERS.

Gold is found in loose material of two very distinct kinds in the Southern Appalachians. True stream gravels carrying gold are not wanting, but much more common are auriferous accumulations of rotten rock in place. As is well known, decomposition of the bedrock in the unglaciated South often extends to a depth of from 50 to 100 feet from the surface. Where the mass was originally intersected by gold-quartz seams, perhaps accompanied by impregnation of the wall rock, the decay of the mass to soft earth takes place without sensible loss of the precious metal. Such deposits can be worked with pick and shovel or, when they are rich enough, by the hydraulic process. In such deposits, as a rule, the original structure of the rock is perceptible to within a couple of feet of the surface. The rock in decomposing may have undergone some change of volume and a trifling amount of movement, but the material is substantially in place.

There is no term in general use to designate this decomposed rock in place, although it is found almost universally in unglaciated regions, even within the arctic circle. It is by no means often possible to name a given occurrence of this kind from the original rock, because, when there are no exposures of unchanged material, it is usually doubtful which of several allied rock species is really present. The word "Geest" was long ago proposed as a general term for such material. This is a provincial German word meaning dry land as distinguished from marshy land. The name does not seem aptly chosen and has not been adopted by many writers. The German term "Gruss" has sometimes been made to serve, but this word denotes a mass consisting of angular fragments, as distinguished from the rounded pebbles of gravel, and it is constantly in use for transported material, as for example "Grusskohle," equivalent to slack-coal.

I propose the term *saprolite*[2] as a general name for thoroughly decomposed, earthy, but untransported rock. When the exact character of

[1] Murchison, Siluria, 4th ed., 1867, p. 459.

[2] From σαπρός, rotten. The term *laterite*, as used in India, where it originated, has a lithological signification and applies in part to transported material.

the original rock is known it is easy to qualify this term and to speak of "granitic saprolite," and the like.

The deposits referred to above, then, are gold-bearing saprolites. In these the original quartz veins are usually but little decomposed, and can be followed at small expense. Near Brindletown the hills are scored with deep trenches thus excavated. In the Dahlonega region a system often adopted is to hydraulic the saprolite, the fine earth usually being allowed to escape after passing through sluices, while the fragments of vein quartz are thrown out by grizzlies, or equivalent devices, and passed through the stamp mill. The losses in this process, however, are very great, owing, it would seem, to the inclosure of the gold particles by films of iron oxides or other substances which prevent amalgamation.

Geologically the saprolites are of course identical with the more solid masses beneath them, yet they sometimes permit the observation of relations less well seen elsewhere. Thus in some saprolites an almost endless number of the thinnest possible quartz seams and the most perfect quartz lenses are accessible not merely in section but in three dimensions. At the Kin Mori mine one can pull out of the saprolite pieces of vein of several square inches area and scarcely thicker than writing paper. But this is not always the case; some auriferous saprolites show almost no quartz. There are instances in which the observer can scarcely believe the results of assays from carefully taken samples, so little indication is there of any gold. Now, the investigations of late years make it certain that quartz is often attacked and dissolved, or is replaced by mica, iron oxides, etc. It seems to me probable that the deceptively rich saprolites are those in which the quartz has been thus removed.

The gold found in the saprolite deposits is naturally very rough, and in some cases, as at the Loud mine, north of Dahlonega, masses of wire gold are met with. If anyone still doubts the origin of the gold in stream gravels he may readily convince himself in the South that the origin of the metal is in veins, for gold can be seen there in all stages from the roughest to the smoothest as the saprolites are followed into the waterworn gravels.[1]

It was stated above that the saprolites often extend to within a couple of feet of the surface. Above that level the soil has usually been worked over by plant roots, if by no other agency, and has thus lost the characteristic rock structure. In some cases, particularly on steep slopes, the disturbance extends to a greater depth and seems due to a different cause. The soil within a few feet of the surface is exposed to the expansive action of daily sunshine and frequent winter frost. In contracting again after expansion, it tends to settle as far down hill as possible, and this tendency is promoted by the fact that fine particles are apt to fall into any crevices which may form in the mass. Hun-

[1] See a paper by Prof. A. Liversidge on the origin of gold nuggets, Proc. R. S. New South Wales, vol. 27,

dreds or thousands of such expansions followed by contractions are nearly equivalent to a slow flow when the mass is soft, as in the case of saprolite. By such means this material is often fed into the head waters of streams, and but for this action the saprolites might be much thicker than they are. Substantially this explanation is given by Kerr, who, however, refers the expansion to the cold of the glacial epoch,[1] a reference with which I wholly disagree. He also points out that this settling process frequently affects schistose rocks when they come near the surface, and I have observed cases in which the laminæ were flexed down hill to a depth of 6 or 8 feet.[2]

Much gold has been obtained in the South from modern rivulet or "branch" gravels, and it is evident that in saprolite areas such gravels must almost inevitably be rich. The earth is removed with ease by heavy rains, while the gold and the larger pieces of quartz remain in the stream bed.

The presence of saprolite also favors the concentration of those rock-forming minerals, which offer relatively great resistance to decomposition, particularly if they happen to be denser than the average mass. Thus near Brindletown the list of rare minerals found in the sands[3] is immense, and nearly all of them no doubt came from the granitic and dioritic gneisses, or from pegmatitic lenses in these rocks.

Of these rare minerals monazite has a commercial value, selling for from 5 to 10 cents a pound, and considerable quantities of it are obtained by panning, a process in which the men, women, and children of the region are thoroughly expert. The density of monazite being about 5, this mineral is easily freed from quartz and feldspar. The magnet might be used to extract magnetite from the concentrates.

About a dozen diamonds have been found in North Carolina, always in gravels, and according to Genth, in every instance associated with gold and zircons. In no case, however, was a diamond found adhering to gold, or containing gold like the Kimberly specimen, a description of which is given at the beginning of the section on Gangue Minerals. It is difficult to guess the origin of the diamonds in a region like the South Mountains, where the rocks are acid or neutral, unless they come from the amphibole-pyroxene blebs in the prevalent country rock.

There are ancient as well as modern auriferous stream gravels in the South, and some of these have yielded much gold. In such cases the well-worn gravel is commonly covered wholly or in part by blue clay containing fragments of more or less lignitic wood. The most extensive gravel bed of this kind which I have seen is on Dukes Creek,

[1] Trans. Am. Inst. Min. Eng., vol. 10, 1882, p. 475.

[2] See description of the Bell mine, Moore County, N. C., in the notes on the Carolinian belt.

[3] Genth mentions among others tetradymite, montanite, brookite, anatase, rutile, zircon, malacon, cyrtolite, monazite, xenotime, samarskite, columbite, fergusonite, chromite, titanite, cyanite, corundum, enstatite, tourmaline, garnet, beryl, allanite, thorite, diamond. Bull. U. S. Geol. Survey No. 74, 1891, p. 89.

near Nacoochee. There is a similar deposit on Yahoolah Creek at Dahlonega, and a small one near Brindletown. Mr. F. H. Knowlton has examined specimens of wood which I collected on Yahoolah Creek, and pronounces them Pleistocene. The conditions indicate either a period during which the streams were dammed back or one during which the slope of the stream beds was temporarily diminished. There is no evidence of temporary damming, and it would seem that the Columbia subsidence must be called upon to explain the phenomena.[1]

The deformation of the peneplains studied by Messrs. Hayes and Campbell[2] and their consequent dissection by streams is a matter of practical consequence. Had the country not been upheaved and distorted the streams would not have cut back into the country, the gold would not have been concentrated in the "branches," and there would have been no outlet for tailings from the areas of auriferous saprolite.

In the Southern Appalachians, as in every region where gold is obtained from streams, it is well known that, other things being equal, gold dust is purer or of higher grade than coarse gold, and that the exterior of waterworn nuggets is purer than the interior. Even Pliny seems to have been aware of this fact and to have had an inkling of its cause, for when speaking of the gold dust obtained from rivers he wrote: "Nor is any gold more pure, inasmuch as it is refined by the flow of the stream itself and by the attrition."[3] Oviedo, Columbus's companion, is much more explicit on this subject, and some of his remarks are so sound as to be worth literal translation, if only to correct a tendency to overestimate modern discoveries in such directions. "It may be considered certain," he says, "(judging from the results), that the greater part of the gold is born in the summits and higher portions of the mountains, but that it is created and engendered in the entrails of the earth; and so as the earth brings it forth or expels it, and because of the abundance of the material in the mountain tops, the storm waters transport it little by little and in time carry it down into the gulches and the ravines of those streams which rise in the mountains; notwithstanding which, gold is often found in the plains far from the mountains." Subsequently he remarks: "I say that when any bank of a river or of a ravine or the river itself is worked within the 'mother ranges' [madres] (as people say), it is always those miners who get the gold at a lower level (I say down stream) who find it purest; so that in proportion as some washers are lower down than others, the gold will be of more carats or of greater value and fineness, because the more the gold travels, the higher and finer the alloy. But those who

[1] Tuomey reports auriferous deposits of rounded gravel near the summit of the Blue Ridge in such positions as to preclude the possibility of the pebbles being rounded and transported by any aqueous force that could have existed since the region received its present form. (Geol. Rept. on South Carolina, 1848, p. 86.) I have not visited any so far from the existing drainage. Lieber mentions gold in connection with Tertiary pebbles. (Geol. Rept. on South Carolina, 1856, p. 77.)

[2] Nat. Geog. Mag., vol. 6. 1894, p. 63.

[3] "Nec ullum absolutius aurum est, ut cursu ipso trituque porpolitum." Hist. Nat. Lib. XXVIII, chap. 21=chap. 4 of some editions.

extract it at a greater elevation, higher up the river, go closer to the birthplace of the gold, and obtain it more often in abundance. Hence it may be inferred that the distance which it moves takes much time, many years, so as to effect the increase of carat and of purity." Again he asserts that: "On the contrary, the nearer gold is found to its vein or birthplace, once it has reached the river, the more crinkled and rough is it and of lower carat and value than it would have been if it had traveled."[1]

Oviedo seems clearly to have understood that the less valuable silver or other admixture was partially removed from the gold grains by the action of the water, and that this process was more complete as the gold grains grew smaller through attrition. The most explicit statement of this action with which I have met is by Mr. Ross E. Brown, who says that the silver and baser constituents of the nuggets when exposed to air and water are partially oxidized and dissolved, so that the surface film undergoes partial purification.[2] It seems probable that the alkaline chlorides present in almost all natural waters must play a part in this superficial refining, which is analogous to the process of "pickling coin blanks" practiced in the mint.

DESCRIPTIVE NOTES ON THE GEORGIAN BELT.

The Georgian gold belt lies in the Piedmont region of northern Georgia and eastern Alabama, receding from the mountains to the southward. This area was baseleveled both in the Cretaceous and in the Tertiary, but the two levels do not appear distinctly separated in all cases. Above them project some monadnocks, and they have been moderately dissected. The country is well watered, sufficiently timbered, and much of it is extremely picturesque.

While a great number of mining properties which have produced more or less gold are scattered along this belt, from near Montgomery, in Alabama, to near Clayton, in north Georgia, there are several points which may be regarded as centers of interest. Such are Creighton, about 14 miles northwest of Canton, at which lies the Franklin mine, Auraria and Dahlonega (two towns only 5 miles apart), and Nacoochee.

The most instructive mine of all those on the belt is the Franklin, for it appears to be thoroughly typical. The workings extend below the 400-foot level, and the mine is in active operation. It affords the only opportunity of making a satisfactory study of the ore bodies in solid rock. At the time of my visit the mine was producing about $100 a day in gold.

The rocks at the Franklin mine are gneissoid mica-schists for the most part, the gneissic structure sometimes being very distinctly preserved. A hornblende-zoisite-schist also makes its appearance here, but does not seem to represent a different series of rocks. No dikes were found directly at the mine, though within a mile of it there are many of

[1] Hist. Gen. y Nat. de las Indias, published 1535, edition of 1851, Lib. VI, Chap. VIII, sections 6 and 7.
[2] Eng. and Min. Jour., Feb. 2, 1895.

them, all granite, but some gray and fine-grained, while others are nearly white, with relatively coarse structure along the median surface.

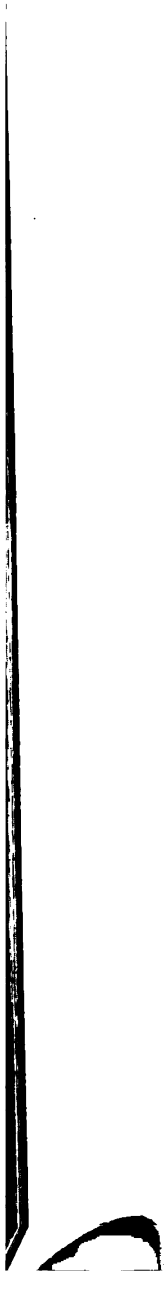
The wall rocks are chiefly undulating schists, and the vein fissures have been opened by a movement such as to produce a series of pipes with lenticular section, closely analogous to the barrel quartz of Nova Scotia, though less regular. The dislocation is marked by sharply incised grooves on the swales of the schist. The ore-bearing schists strike in an average direction N. 56° E. and dip at 41° to the southeastward. In this plane the corrugations and the pipes make an angle of about 56° with the strike of the walls, pitching northeastward. The incised grooves also pitch northeastward at an angle of about 27° less than the pipes, the angle between them being measured in the plane representing the average schistosity. Such grooves would be produced by a dislocating force in a plane at right angles to the plane of schistosity, and so oriented that the intersection of the two planes coincides with the grooves. The direction of the force would be at an angle of about 45° to the movement it produced. There are two such directions. A force in one of them would cause normal faulting, while a force in the other would cause abnormal faulting. If the faulting was normal the force producing it was in a vertical plane striking nearly N. 40° E. and pitched to the northeastward at about 50°. This force would bring about a motion the horizontal component of which is about twice the vertical component, so that the hanging wall would be shifted to the northeastward relatively to the foot wall by a distance twice as great as the slip downward to the southeast.

The dislocation which opened the ore chambers at the Franklin was a normal movement, as is shown by the fact that there are numerous stringers which show smooth walls and dip more steeply than the slate. This subject has been discussed in the section dealing with Structure.

The gangue minerals at the Franklin are quartz, with occasional calcite, a little muscovite, much pyrite, and some chalcopyrite. The pyrite is usually most abundant where the quartz is richest, and at such points, as a rule, the adjoining slates also carry numerous large, well-developed, auriferous pyrite crystals, resembling in all respects the pyrite in the quartz. Such rock is of course ore, and its occurrence in this manner throws light on the distribution of gold in saprolites.

The ore bodies are composed of innumerable quartz stringers, each a flat lens or pipe petering to a feather edge, but replaced by other similar bodies. There seems at this mine no indication of a regular shingling (or imbrication), so that a fresh stringer is as likely to appear in the foot as in the hanging. Such a body of ore is not, as a whole, a vein, and I have suggested the name "stringer lead" to describe it. The larger features of the deposits, as well as the minor details, exhibit the tendency to lenticular structure.

There can be no question that the ore in the Franklin is a deposit from aqueous solutions in interstitial spaces due to mechanical rupture.



The ore carries fragments of a thoroughly schistose wall rock, and there is not a trace of rounding or other phenomena of solvent action.

The ore of the Franklin carries about $6 per ton. About half of this gold is saved on the battery plates. The clean sulphurets assay about $56, and the concentrates, which contain about 50 per cent of sulphurets, are treated by the wet chloridation process as modified by Mr. Adolph Thies.

The proportion of gold obtained by direct amalgamation at this mine is actually much greater than in the saprolite mines of the belt, where the sulphurets are almost totally oxidized. This is an extremely remarkable fact, and one highly encouraging to deep mining in Georgia. It also shows, I think, that in the saprolite mines much gold once free has become "rusty," or coated with films of substances which prevent amalgamation.

A second vein accompanies the Franklin at a distance of about 150 feet. It is called the McDonald, and has been prospected by shafts which are now inaccessible. The rock and the ores as seen on the dumps of the shafts appear to be nearly the same as at the Franklin, but more gneissic.

The Sixes mine, some 8 miles in a southwesterly direction from Canton, shows a mass of granite which has been reduced to schist only in part. The composition of this rock is normal. Near by in a rivulet a black schist, probably of dioritic origin, crops out. It carries actinolite and zoisite. It is said that crystallized gold has been washed out in the streams at this locality. The Sixes mine has long been abandoned and nothing is to be seen of ore or of its geological relations. At the Wilkinson and Cherokee properties, about a mile southeast of the Sixes, the wall rocks are the usual gneissoid schists of the Georgian belt with the usual strike and dip, and the ore appears to have occurred in stringer leads. The same may be said of the Strickland mine, about 4 miles a little east of south from the Franklin. At the Dr. Charles mine, which is near the junction of Dawson, Forsyth, and Cherokee counties, mispickel is abundant, and the deposits are stringer leads.

At this property, in the saprolite and in the partially decomposed rock, there are numerous slickensided surfaces stained black with manganese, probably in the form of wad. Such slickensides in such positions are abundant throughout the belt, but I have looked in vain for anything of the sort below the water level. It would seem that the slickensiding is due only to the changes in volume attending decomposition, of which also the manganese stains are a result.

The Kin Mori and McGuire properties adjoin each other and lie in Dawson County, about 4 miles southwest of Dawsonville. No work has been done on them for years. Large cuts have been made in the saprolite and some tunneling has been done on stringer leads. The more solid exposures of rock are gneissic schists and the darker schists which I suppose of dioritic origin. The strike is N. 50° E. and the dip

is 50° to 65° to the southeast. Some of the schists contain garnets. A part of the rock shows undulous and carunculated cleavage surfaces, and my guide informed me that the stringer leads are best developed where one wall shows such structure and the other is characterized by flat cleavage. At one point on the Kin Mori property, near the mill, a vein is exposed which shows 4 feet of solid quartz. This is very probably on the same fissure as a heavy cropping about 8 feet in width to the southwest and on the other side of the Etowah River. Both exposures carry sulphurets, but appear to be very low grade, as are many of the thicker quartz veins of the belt.

In portions of the saprolite of the Kin Mori there are great numbers of tiny quartz veins, scarcely thicker than writing paper. At one point twenty such were counted in a mass only an inch thick. On the McGuire there is a very large amount of white float quartz full of tourmaline needles. This must come from a vein near by, but none of the rock could be found in place. Tourmaline-bearing quartz is not known to occur with the ore at this property.

Dahlonega and Auraria (formerly Knucklesville) are surrounded by mining properties forming one continuous district geologically and technologically. In this district work has been confined almost entirely to the saprolite, and exposures of rock in place are to be found only where natural erosion or hydraulic washing have laid it bare.

The rocks are hornblendic schists, gneisses, and gneissic schists. In one or two cases fragments of the darker schists or of a similar rock appeared to be included in the gneiss. The gneisses are for the most part dynamometamorphosed and schistose, but in limited areas they show only gneissic banding, and this is occasionally almost insensible, so that the rock approaches simple granite. Such an exposure appears in the bed of Yahoolah Creek below the Murray mine. Ordinarily the gneissic sheets are extremely distinct and are parallel to the schistose cleavage of the country, but in a few cases the schistosity cuts the gneissic structure. Sometimes the schists pass over into true slates.

No unquestionable dikes were found in place in this district; in some cases, however, bad exposures left it uncertain whether unusually well-marked sheets in gneiss might not be intrusions. Instances of this kind were seen near the Hand mill. Notwithstanding my failure to find well-marked dikes, I find it impossible to believe that there are none. On the dump of the Wells mine near Auraria there is a slightly schistose quartz-diorite, which probably came from a dike.

In spite of the schistose structure of the rock, weathering in some cases has produced rounded forms which are analogous to the domes of the Sierra Nevada, although on a very small scale. Instances of such rounding occur in the Yahoolah and the Barlow mines, and seem to indicate that schistose deformation was locally unaccompanied by even blind joints. Had it been otherwise the rock could not have behaved to the weather like a homogeneous mass.

The average strike of the schists is about N. 30° E. and the average dip about 40° eastward. In the Auraria end of the district the strike and dip are pretty constant, or vary slowly, but at Dahlonega the variation is great and sudden, so that it is difficult to arrive at any proper mean values.

The gangue minerals in the gold quartz are usually pyrite and more rarely chalcopyrite. In the Findley mine mispickel, galena, and calcite make their appearance. Muscovite is sometimes to be seen in the ore, for example at the Barlow, where also there is siderite in the veins. Shepard in 1859 first described a remarkable mineral locality on the Chestatee River under the name of the Field mine, which, so nearly as I can ascertain, is the same place on that river referred to by Prof. H. Credner in 1867, though he gives no name to the property. I was not aware of the existence of this deposit at the time of my visit to the region. The authorities referred to found in the gold-bearing quartz allanite, apatite, chlorite, garnet, ilmenite, pyrrhotite, and tetradymite.

In the Lockhart mine a considerable amount of garnet exists in the quartz veins. Some of this, which seemed quite free from quartz, was kindly assayed for me by Mr. Arthur Weld, superintendent of the Hand and Barlow properties. It carried no less than $10.74 per ton. On the Whim Hill property near Auraria the schist contains much garnet in well-developed crystals. Some of these of the size of nuts were also assayed by Mr. Weld, and they too were found to be auriferous, although no quartz seams appeared near them in the schist. Gold-bearing garnets have long been known in the district, though the fact has not been published, so far as I can ascertain. Professor Hanna, of Charlotte, N. C., and Mr. Adolph Thies, of the Haile mine, possess specimens of garnets from this district showing free gold. It appears, therefore, that when garnet-bearing schists are found near gold veins it is worth while to assay them.

In the Singleton mine, near the quartz veins, there is a vein of milky quartz carrying tourmaline. It is said to be barren. On the Whim Hill property there is also similar tourmaline-bearing quartz, which Mr. Weld found gold-bearing by assay.

The original deposits in this district are almost without exception stringer leads, for the most part conformable to the schistose cleavages, but not following them accurately. Spurs of quartz diverging into the country rock are frequent, and included fragments of schist are not uncommon. They are of precisely the same type as those studied at the Franklin. The wall rocks also, as at the Franklin, are often rich for a few inches from the quartz stringers.

On manuscript maps of the district belts of ore-bearing ground are sometimes shown at tolerably regular distances apart and extending for miles through the country. Assertions are also made that these belts can be identified by the character of the ores. I could see no evidence of such remarkable continuity. On the contrary, it seemed

to me that this part of the Georgian gold belt may be likened to a magnified stringer lead, an aggregation of lenticular, ore-bearing masses, which, considered singly, die out in strike and are replaced to the east or west by other similar bodies. Nevertheless, it seemed to me probable that two lines across the strike and a mile from each other would intercept about the same number of auriferous masses.

The ore seems to occur more plentifully in the gneisses than in the dark dioritic schists, which also appear to be tougher than the gneiss and less subject to fissuring.

A considerable number of small faults are to be seen on the stringers in the district, and all of those observed were normal. They do not appear to have taken place after the deposition, but during the preliminary dislocation of the rock. The quartz has been deposited in interstitial spaces or in the more or less porous wall rock, and no trace of substitution was found.

The saprolites are of variable depths, reaching, it would seem, at least 100 feet in the Preacher mine. One portion of the rotten rock is distinguished as "brickbat," from its red color, and this is usually found to be barren. It appears to answer to the dark ferromagnesian schist. The saprolites show numerous quartz veins, mostly not over 2 or 3 inches in thickness. In some cases there is little or no quartz; for example, at the Hedwig property, near Auraria, although the mass assays over $2 per ton. As remarked elsewhere, I suppose in such cases that the quartz veins were minute and that they have been resolved into other minerals by solutions. It is now well known that limonite may be substituted for quartz and that large bodies of that iron ore may be formed in this way.

At the Singleton mine there are stream-bed gravels overlain by blue clay containing fragments of wood and cones. The slack water indicated by the clay deposits, judging from these plant remains, is referable to the last well-marked subsidence of the coast, answering to the Columbia formation.

On the Chestatee River is the Chestatee claim, where, at the time of my visit, preparations were being made to turn the channel and work the river bed. At this property are often found pebbles of a heavy mineral which the miners call "hovas," a word of origin unknown to me. This material is an impure corundum and should be worth saving. Being of great density, it is naturally found with gold in the gravels.

About 5 miles east of Dahlonega, on the Chestatee River, is a newly opened pyrite mine. The ore carries some chalcopyrite and, it is said, a trace of gold. I was informed that within a few hundred feet of this deposit there are intercalated stringers from which some hundreds of dollars' worth of gold have been obtained. Pyrite is reported to have been found on the strike of this body at intervals for some miles. The ore bodies are most likely flat lenses. The gneissoid schists at this mine strike N. 47° E., in fair accord with the whole region, but they dip

to the northwestward at about 65°. I have discussed such anomalies under the head of Structure.

A vast amount of the saprolite ores remains to be worked in this district. This material can be handled very cheaply by hydraulicking the mass, sluicing to the mill, and crushing the quartz fragments. The coarse free gold is recovered from the sluices and a large part of the gold in the quartz is caught on the battery plates, but in the ordinary practice an immense proportion of the entire contents passes off with the tailings. Careful investigations by Mr. Arthur Weld show that this method saves only about 25 per cent of the gold, or even less. This gentleman is engaged in intelligent efforts to improve the method and has met with considerable success. It would appear that the rustiness of the gold must be overcome either by more friction, as, for example, in amalgamation pans, or by chemical means. Unless means can be devised of getting at least half the gold, surface mining in this region must, in my opinion, remain an unimportant industry, but I do not believe the problems involved at all beyond the reach of good metallurgical engineers.

The Loud mine, about 14 miles northwest of Dahlonega, is noted for its coarse gold, which is of unusually low grade, running about eight hundred thousandths fine. While some of the gold obtained here is smooth and waterworn, other specimens are very rough, and several masses of wire gold have been found. The deposit consists in part of stream gravel and in part of saprolites, which explains the various forms of the gold. The schists here are of the usual character, strike, and dip. The quartz stringers also bear the usual relations to the rock. Several light-colored, coarse granite dikes of unmistakable nature are to be seen in the open cuts.

Near the beautiful Nacoochee Valley the rocks are gneisses, mica-schists, and hornblendic schists, with numerous granitic dikes, a few fine-grained and gray, but for the most part light-colored and coarse. The schists in which gold has been found strike about N. 30° E., and dip steeply to the northwest, but to the eastward of Yonah Peak, a gneissic monadnock, they dip easterly. Work on a small scale was in progress on two properties at the time of my visit. At the Lumsden tributers were following up small veins in the saprolite. The exposures showed the usual stringer leads of the Georgian belt, but not developed in great force. Much of the schist carries garnet, and the garnets are auriferous, as I was informed by Mr. Lumsden. I cleaned, crushed, and panned a few ounces of these garnets and obtained many small grains of gold.

The property of the Yonah Land and Mining Company lies along Dukes Creek. It contains many acres of stream gravel lying about due north of Yonah Peak. The lower portion of this deposit consists of water-worn gravel, which is in part covered by blue clay. In this are found numerous semicarbonized fragments of wood and cones similar to

those noted at the Singleton mine in Dahlonega. The material overlying the clay is the ordinary angular and subangular detrital gravel of the region. In past times much gold has been obtained from this deposit, and it is known that care was taken to work the richest ground. Whether much of the remainder will pay a considerable profit can be determined only by experiment. The same company has exposed a number of veins by cross-cut trenches at points on the south side of Dukes Creek, 2 to 3 miles in an air line from Nacoochee. Some of these veins are 18 or 20 inches in thickness; some of them are intercalated in the schist, while others cut it at low angles. There is no question in my mind that all of them are of the same origin and age, it being a mere accident whether the fissures follow or cut across the schistose planes of the rock. These larger veins were not sufficiently exposed to enable one to pronounce upon their continuity, but in the same rock were many lenticular stringers. This and the characteristics of the whole Georgian belt lead me to believe that the individual seams will be found to be flat lenses grouped in stringer leads. The assays are encouraging, being from about $4 to $20 per ton. With good management and the Thies process it would seem that some of this ground should pay fairly well.

Two miles south of Nacoochee an asbestus-like mineral is being mined. This, on chemical examination, proves to be fibrous serpentine, or chrysotile. The exposure was not such as to make it possible to determine the origin of this serpentine; it may have been a pyroxenic bleb, such as has been described in the South Mountain district of North Carolina.

Close to Burton is a property called Smith's mine. There are several quartz veins on it from 18 inches to 4 feet in width. They seem to strike between 30° and 40° east of north and to dip very steeply to the northwest in conformity with the schistose surfaces. They are so slightly exposed as barely to be visible. It is asserted that some fifty years ago a vein was followed in the saprolite and much gold found. There are certainly remnants of an old tunnel. Considerable cuts have been excavated in the saprolite, which shows the usual stringers of quartz. The Moore Girls' mine, 12 miles northwest of Clayton, on Persimmon Creek, is a trifling excavation exposing heavy blocks of quartz so slightly that it is not even certain whether they are in place. The quartz sometimes shows pyrite and chalcopyrite, and a little gold is said to have been obtained.

The Boilston mine, in Henderson County, N. C., is on the strike of the Georgian belt, far to the northward of the others. It lies in the easterly flank of a ridge to the west of Boilston Creek, and about 10 miles northeast of Brevard. Several veins are reported to exist on this ridge, of which one only has been worked to any extent. The country rocks on the Boilston claim are micaceous and hornblendic schists, which strike about N. 30° E. and dip to the eastward. There is also a heavy dike of granite running nearly parallel with the veins

at a short distance from them. It is some yards in width, and is traceable for several thousand feet. The Boilston property shows two veins, one of which reaches 20 feet in width at certain points. It is on this vein that most of the work has been done, but in spite of the great amount of quartz, mining was unprofitable, the pay streak in the vein being narrow. This vein strikes nearly with the country rock, but dips steeply to the westward, cutting the slates. The quartz has taken a mold of the fractured edges of the slate and at first sight looks schistose, but more careful examination shows that it is fairly solid and includes thoroughly schistose masses of the country rock. Some openings have been made on the second vein, which gradually approaches the first toward the northeast. The granite dike referred to above lies between the two veins and comes almost in contact with the lower one at what is known as the Baring shaft. It can hardly be doubted in this case that the dike and the veins are genetically connected.

The gneiss here is probably Archæan, but there are also sedimentary rocks in the district, some of them carrying auriferous quartz stringers, as is mentioned in the section on rocks.

Considering the Georgian belt from an economical standpoint, it appears to me probable that the stringer leads below water level may be worked at Dahlonega and Nacoochee as well as at Creighton at a fair profit, provided that operations are conducted under vigorous and economical management; but I see no prospects of sensational returns. The present method of working the saprolites is very wasteful and yields insignificant returns. If means can be found to save the rusty gold much money may be made.

DESCRIPTIVE NOTES ON THE SOUTH MOUNTAIN MINING DISTRICT, NORTH CAROLINA.

This district extends from near Morganton to near Rutherfordton, and from the South Mountains to the west-northwest, a distance of 10 or 12 miles.

The area is peneplained, the average elevation of the surface being approximately 1,300 feet, but its height increases from the northeast toward the southwest. This peneplain seems to answer to the Tertiary baselevel of Messrs. Hayes and Campbell.[1] It is somewhat dissected in consequence of its elevation and contortion, but not sufficiently to afford good facilities for hydraulic mining on a large scale; in other words, there is a lack of fall and dumping ground. It is possible that there is a second peneplain some 500 or 600 feet above that mentioned. The contour map of the region gives some indications of such an one, but none was observed, and indeed could hardly have been detected from the level of the mines.

The region is undulating and covered with timber, mostly of second

[1] Nat. Geog. Mag., vol. 6, 1894, p. 63.

growth. It is fairly well watered, though there are few points at which a supply sufficient for hydraulic mining can be obtained.

The surface rocks are decomposed, and almost everywhere to a considerable depth. Perhaps 50 feet would be a fair estimate of the thickness of the rotten layer, for which I have suggested the name saprolite, and it is only occasionally that local erosion has laid bare fresh rocks fit for microscopical study.

Gold was discovered in the district in the bed of Brindle Creek in 1828, and the search for it has been prosecuted with more or less energy and success ever since. It is said to be impossible to estimate the product with any approach to accuracy. Much gold was coined into Bechtler dollars [1] and much is supposed to have been exported in crude form.

So far as I can ascertain, only the placer deposits have been worked with much system or energy. There has been much work done in a small way on little veins in the saprolite, but since the war chiefly by men and women working singly or in small gangs, the pan being the main means of separation. Occasionally these people strike a small pocket with from $5 to $100 in it. For the rest they subsist on trifling quantities of gold and great hopes. It is said that an average of from 60 to 70 cents per day could be made by an industrious and skillful independent miner. The women, beginning in childhood, develop great acumen in selecting ore, and become very expert in panning it. Mining on the larger veins has been attempted to some extent, and a good many shafts have been sunk to about 100 feet. The ore from some of these mines looks good, and is said to assay extremely well, $15 or $20 being often asserted as an average, and much higher values being sometimes given. I am not able to verify these statements. None of the mines were producing anything worth mention at the time of my visit, and the ore in place was almost altogether inaccessible, so that no representative samples could be obtained. It would have been of no use to sample the specimens or trifling ore dumps which were to be seen. There is no question at all that fine specimens are found, and assays at the United States assay office at Charlotte show ores running above $60 per ton. On the other hand, the ores could be mined and reduced for $3 per ton, or thereabout, and it seems incredible that veins of 18 inches or more in width, *averaging* $10 or over, should be allowed to remain idle. From an economic standpoint it seems to me that the veins should be prospected with local capital. If reasonable quantities of ore with an average content of $10 can be put "in sight," i. e., exposed on three or four sides, there can be no doubt that capital from commercial centers will be forthcoming.

The main country rock of the district consists of schistose gneiss, in part micaceous and in part hornblendic; it often contains augite, and plagioclase frequently predominates over potash feldspars. Microcline

[1] This curious coinage is referred to early in this report in treating of the statistics of the region.

is abundant in some specimens. In the more hornblendic varieties quartz is sometimes nearly or quite absent. At many points in the region, for example, on the elevation a mile easterly from Capt. J. C. Mills's (whose house is indicated on the Morganton sheet), near the Marion Bullion mine, and elsewhere there are dark blebs in the gneiss. These are often flattened in the direction of the schistosity. It is evident that they offered greater resistance to dynamic action than the mass of the rock, and the schistose laminæ are often curved at the contact, more or less like the grain of wood near a knot. These blebs are in some cases highly and in some exclusively pyroxenic, and in other instances hornblendic. They seem altogether similar to the blebs common in most granite regions. Similar or analogous blebs occur also in andesites. The largest bleb seen is about half a mile easterly from the Marion Bullion or Brackett mine. It is about 100 feet in diameter. They resist decomposition somewhat better than the gneiss, and when found in the saprolite are considered "bowlders" by the mining population. They do decompose, however, in some cases to serpentine and in others to talc. There appears to be true lenticular pegmatite of local origin in the region, and Captain Mills has found tourmaline and beryl in them. There are also coarse dikes of granite, such as are often called pegmatite, the margins being much finer grained than the central portion. Such a dike, cutting one of the veins which has been worked on the Marion Bullion property, strikes north and south, and is said to throw the eastern portion of the vein 4 feet southward. At the Vein Mountain mine also a series of such dikes is observable in the saprolite. They strike N. 50° W. and dip easterly about 70°. Two of them occur a couple of feet apart and have faulted the gneiss normally, one throw being a foot and the other 9 inches. In the same neighborhood there is still another similar dike, striking N. 20° E. One dike of gray fine-grained granite was also observed crossing the road about half a mile south of Captain Mills's house. It strikes N. 23° W. and dips 80° NE. The connection of the dikes with the ore deposits is not direct or close; nevertheless, for reasons stated under the head of Structure, it is believed that their intrusion was coeval with the ore deposition and a result of the same general set of causes.

A very remarkable feature of this region is the fact that the ore-bearing veins, large and small, an almost countless number, are parallel, and strike N. 60° to 70° E., dipping to the northwest at angles of 70 or 80 degrees. According to Mr. Nitze, who has studied this district in much more detail than I have done, this rule prevails throughout, and among the many veins which I have seen no exceptions are found. This regularity is the more remarkable inasmuch as the fissures were produced in a region which had already acquired pronounced schistosity during some earlier era of disturbance. The cleavage of the gneissoid schists is much less regular than at most points in the Southern States. In the region surrounding the South Mountain dis-

trict the usual strike is that of the Appalachain chain, and the dip is easterly. On the flanks of the South Mountain the schistose cleavages strike on the average N. 20° W., dipping at various angles to the northeast, and there appears to be some local cause of confusion. In the western portion of the district the strike is more nearly northeast, with a southeasterly dip, but the dip of the surfaces varies greatly and is often nearly flat. Thus the forces which opened the fissures now filled with ore acted upon a highly eolotropic mass. In this connection the reader may be reminded of the conglomerates which have been sliced up by joints; for example, the Carboniferous pudding stones of Newport Island.

As most of the veins are exposed only in the saprolite, it is impossible to study the faulting on them satisfactorily. One small vein on the Mills property was noticed, with a normal fault of an inch, and two of the small veins at the Marion Bullion are faulted, one 3 inches and one one-half inch, both normal. Since the veins manifestly form a system, and since on any system of parallel fissures the direction of faulting is uniform, these three cases may be taken as indicative of the movement of the entire district.

Faults such as these would be produced by a force acting in a vertical plane which strikes N. 20° W. and directed southward at an angle of about 50° to the horizon.

In the South Mountain district there appear to be no real veins intercalated in the slate, though there are some local segregations of glassy quartz in this position. The term "segregated vein" is sometimes applied to veins coinciding in direction with the structure of the country (whether this structure is bedding or schistosity); "true" vein being reserved for veins which cross the structure. It makes little difference what things are called, provided that the names given are not misleading, as they are in this case. Local segregations of ore-bearing gangue minerals really exist, although, in my experience, they are neither common nor important. If the term "segregated vein" is to be employed at all it should be confined to those. A true vein should be understood to be filling of a true fissure, i. e., a crack or split made in rock previously continuous. Whether this crack follows or crosses the structure is of little moment.

In the distribution of the veins in the South Mountain region there seems, from such information as I possess, to be a certain rhythm, which is suggestive and may prove of some importance. Veins of relatively large size usually occur at considerable horizontal intervals, while between the larger veins small ones are interspersed, often in very close proximity to one another. The most northerly of the large veins of which I have notes is on what is known as the Neighbor's property, on the waters of Muddy Creek, some 5 miles slightly west of north from Dysortville. At this locality there are three veins. The most northerly is sometimes called the Forney vein and is 18 inches wide, the

strike being normal as far as known. Further south, at a distance of 1,200 feet, is the Neighbor's vein, 20 inches wide; its strike is N. 65° E., and the dip is 75° NW. Again to the south 500 feet is a smaller vein, 8 inches to 10 inches wide. Some miles further southwest the veins of the Vein Mountain Mining Company occur. The principal deposit here is called the Nichols vein. It strikes N. 70° E., and varies somewhat in width from 5 inches up to 3 feet, according to the statements made by the superintendent, and in part verified by observation. The average is said to be about 18 inches. Nearly on the strike of this vein is one of about the same width, one-third of a mile south of Brindletown post-office. Five or 6 miles farther south occur the veins of the Idler mine, the principal one of which is about 17 or 18 inches wide, and not far off are the veins of the Ellwood property of a similar width. Thus there appear to be three groups of strong veins at distances of several miles apart. The multiplicity of small veins is very great. For instance, on the Vein Mountain property 33 small veins have been counted in a strip of country only a quarter of a mile wide, and there is reason to believe that this large number falls short of the fact. On the Mills property, too, small veins often occur at intervals of 20 feet or less. It is to be presumed, I think, that the larger veins have in general been more thrown than the smaller ones; for if a fissure were faulted only an inch it is altogether improbable that protuberances would be brought in contact in such a way as to wedge the crack open a foot. Hence it is probable that in the rupture of the country there was a fluctuation in the intensity of the dislocating forces, which is marked by the larger veins. It is evidently much more probable that this fluctuation is rhythmical than that it is wholly without rule. In the flexure of rocks recurrent maxima may often be observed, and such cases are visible in the South Mountain district.

The filling of the veins of the district seems to present nothing unusual. The quartz is sometimes glassy, sometimes milky, and often of that intermediate appearance known among Western miners as "lively." It is in this last variety that gold is most abundant. The quartz is often saccharoidal, a mass of loosely adherent, imperfect crystals, and such quartz is frequently more than usually rich. In a great majority of cases auriferous quartz is streaked with sulphurets or their decomposition products, and of course the oxydized ores yield their gold more readily than those in which the sulphides are fresh. The accompanying minerals are usually pyrite and chalcopyrite, with occasional manganese oxide. Galena and zinc blende are also met with in some of the deposits. Above water level the sulphides are rarely fresh, and the good quartz is there rusty and cellular. I looked in vain for any evidence or replacement of country rock by ore. There seem to be no rounded angles or enlarged fissures, and in one case, at the Marion Bullion mine, a small "horse" in the vein was observed, which retained its angularity most perfectly. It was evident that if the quartz had

been removed the walls and the horse could have been brought together so as to fill the space completely.

The placer deposits are of two varieties. In a majority of cases the ground washed is simply saprolite intersected by small, more or less disintegrated quartz seams, and capped by 3 or 4 feet of stony soil which has lost the rock structure by the action of vegetation and frost. Doubtless this surface layer commonly represents the residuum of a thicker layer of rock, the more soluble portions having been removed by rain and vegetable assimilation. Such placers are very conveniently worked when water can be brought to them. At a lower level, along the rivulets—or "branches" as they are called in this part of the world—there are also true secondary gravel deposits, which have been worked wherever practicable. Even in these cases the material has not been moved to any great distance, and most of the fragments are subangular. The richest portions, as is usual in alluvial deposits, are in the lower parts of the coarser streaks of gravel. Many of the placers would undoubtedly pay well if it were practicable to "pipe" them on a moderately large scale. It is said that on the Vein Mountain property the opportunity for the application of the hydraulic process is good.

The sands of the South Mountain district contain many rare minerals, whose detection is due largely to Mr. W. E. Hidden. The more important of them have been enumerated in the systematic discussion of placers.

The preceding notes are extremely unsatisfactory. The only mines in the district at which any work is being done are the Hancock placer and the Marion Bullion, and little is to be seen at either. The Golden Valley is a placer which has produced gold, but is not now being worked, and I was told on good authority that there is nothing of interest to be seen there. There are many other points at which gold has been obtained in the region, but the localities mentioned are believed to be the only ones at which there has been any notable production.

More information on this district will appear in a paper by Mr. Nitze, in the Second Biennial Report of the Survey of North Carolina.

DESCRIPTIVE NOTES ON THE CAROLINIAN BELT.

Much the most important mine on the Carolinian belt is the Haile, in Lancaster County, S. C. It is extensively developed; it represents a geological type unknown in the other areas dealt with in this paper, and it is the only mine in the South which has for a considerable number of years past paid dividends. The characteristic ore of this deposit is impregnated rock, a fact which lends additional interest to the fissure system through which the impregnation has taken place.

The country rock at the Haile is for the most part more or less siliceous muscovite-schist (ordinarily spoken of as talcose schist), the schistosity striking on the average N. 50° E. and dipping 70° to the northwest. The mass of schists is intersected by a number of diabase

dikes striking and dipping at various angles. At least a portion of the country rock is of volcanic origin, containing original crystals of labradorite and quartz grains now showing undulous extinctions in polarized light. Flow structure is still visible in the ground mass, and one of the quartzes contains an inclusion which seems to be glass. The slides show a large amount of muscovite in minute scales. These characteristics are visible in spite of the schistosity of the mass, and it is manifest that the eruptions antedate the period at which the country was converted into schist. This fact, together with the frequent recurrence of similar rocks from here to the South Mountain of Pennsylvania, where they are known to be pre-Cambrian, points to the Algonkian as the age of the Haile schists.

The "amount of shear" in these rocks is small, for when prismatic cleavage is found the cross sections of the prisms are very nearly rectangular. The development of schistosity was attended by the corrugation of the schists, the corrugations pitching downward steeply to the northeastward. Such is also the pitch of the ore bodies. The schists have been dislocated, this dislocation being marked by incised grooves on the schistose swales or corrugations. These grooves are finely shown in a stope between the 160 and the 200 foot level at the Cross workings. The grooves dip at an angle of only 15° and the slope downward to the southwest They indicate a dislocation with a very large horizontal component tending to bring into opposition the corrugations of the schist and to form open spaces.

The foregoing notes on structure are similar to those made at the Franklin mine in the Georgian belt, yet the results are very different. While at the Georgian mine the ore is substantially confined to the fissures, only a few inches of wall rock being impregnated, at the Haile the great mass of the ore is impregnated rock, and one might almost overlook the quartz stringers. Nevertheless, the latter exist, and indeed in lenticular form and in stringer leads though these are poorly defined. These relations make it substantially certain to my mind that impregnation has gone on in the Haile through a fissure system analogous to the fissure system of the Franklin, but that in the Carolinian mine the nature of the wall rock lent itself to more complete impregnation. It might be asked whether the composition of the ore-bearing solutions was not the determining cause of impregnation, but the character of the actual ore seems opposed to this hypothesis. The ore consists of quartz, pyrite, and gold, almost without other minerals, and the solution would seem to have been unusually simple. At other mines of the same type in the Carolinian belt there is chalcopyrite, indicating solutions indistinguishable from those which deposited ore at the Franklin. On the other hand, glassy volcanic rocks are often porous and always chemically unstable, so that there is good reason to believe that they would lend themselves to impregnation with more ease than gneissic schists.

The impregnation of the rock was attended by deposition of pyrite, usually with quartz, which often forms fibrous fringes attached to the cubes of pyrite. Some of the ores are converted into "hornstone," which, in this case, is quartz recrystallized in fine interlocking particles. Between these grains tiny scales of muscovite are visible with high magnifying powers.

While the ore bodies follow the dip of the schists and the pitch of the corrugations, they are also dependent on the diabase dikes, lying directly against them and being richest close to them. The dikes are decomposed at the contact with the ore, and I observed a little pyrite in the dike rock, but this rock is not appreciably auriferous.

The Haile includes two distinct workings at a distance of about 1,500 feet from each other, known as the Cross mine and the Bequelin mine. The ore is low grade, averaging only about $4.50 per ton, but the mine is worked with energy and economy, and ore sufficient to last several years is kept "in sight." Approximately a third of the output is said to be clear profit. About one-third of the gold is obtained by direct amalgamation; the remainder is extracted by the chloridation process as modified by the superintendent, Mr. Adolph Thies.

The Brewer mine in Chesterfield County, like the Haile, was worked very soon after the discovery of gold in South Carolina, and, as has been mentioned before, 100 or 200 men were employed there in 1830 to 1831. At the time of my visit, however, it had recently been shut down and there was no one on the ground from whom any valuable information was to be obtained. The property showed an old shallow placer of no special interest excepting that it afforded an opportunity to take the dip and strike of the somewhat confused schists, and an enormous pit something like 150 feet in depth, the walls of which are composed of highly silicified rocks. Some of this disintegrates to excessively fine white sand. A portion of the rock near the bottom of the pit is evidently brecciated. Under the microscope it appears that porphyries were present and that the hornstone is identical with that of the Haile mine. There seem also to be recent secretions of hydrous silica, such as are often observed in volcanic masses, and decomposition, possibly solfataric, extends to the bottom of the great pit. Mr. Thies informs me that near the pit there is a diabase dike.

The Brewer is famous for rare minerals, the list of which may easily be compiled from the table of gangue minerals presented earlier in this paper. The association of cassiterite with gold in this mine is peculiarly noteworthy, and may indicate the presence of now unrecognizable greisen.

The West and the Thompson mines are close together, some 3 miles in a southerly direction from Glen Springs, Union County, S. C. The rocks are micaceous and hornblendic schists similar to those of the Georgian belt, but the dip of the cleavage is steep northwesterly. Between the mines and Glen Springs, however, southeasterly dips

appear. In the cuts it is evident that the quartz is deposited in what are called in this report stringer leads, in all respects analogous to those of the Georgian belt. The Thompson was being worked on a small scale at the time of my visit, the system employed being the so-called Dahlonega method of combined hydraulicking and milling.

The Kings Mountain mine, Gaston County, N. C., is a very peculiar deposit. It is said by Mr. Hanna to have yielded some $900,000, and at the time of my visit it was just being reopened under the superintendence of Mr. John A. Church. The country rock of the lower part of this mine is limestone. This seems to be a lens embedded, to some extent at least, in schists. Toward the surface it is wholly covered in by micaceous schists striking about N. 50° E. and dipping 70° to the northwest. It is said by the old miners that a granite dike occurs in an inaccessible portion of the mine, but I was not able to verify the report. A couple of miles from this mine there is a tin deposit in granitic rocks, so that the existence of such a dike would be anything but surprising.

The greater part of the gold was obtained in the upper portion of the mine where the walls were schist. There are no tolerable exposures of such ore remaining, but in recent trenches enough can be seen to show that the quartz was intercalated in stringers. The brown ore of the upper workings was probably saprolite filled with decomposed auriferous pyrite, forming selvedges to the quartz stringers. The mass at the contact with the limestone was extremely rich. The ore bodies in the limestone, which is schistose, are very noteworthy. They form lenses within the rock, striking at an angle of only 30° east of north, with a pitch to the northeast, and three such lenses are known to exist. They are mixtures of limestone, in part silicified, and quartz stringers. Graphite also makes its appearance at some points on the hanging wall. The ore contains free gold, in part in the limestone, some fluorite, biotite, pyrite, and pyrrhotite, chalcopyrite, mispickel, galena, zinc blende, tetrahedrite, and the rare minerals nagyagite, bismite, and bismutite. In such an association one might expect to find the gold heavily alloyed, but this is not the case, the fineness being reported at 0.929 by Devereaux in 1881. As a curiosity it may be noted that at one point in the mine a blue, jelly-like slime pours slowly down the walls, the blue color being due to copper sulphate. Chrysocolla occurs at an old shaft a few hundred feet from the main shaft.

I have little doubt that the peculiarities in structure are chiefly due to the presence of the limestone. But for this mass the deposit would probably have been a mere stringer lead and perhaps fewer minerals would have been precipitated. The mine will be well worthy of extended study when it is thoroughly reopened.

In the neighborhood of Charlotte, N. C., there are many points at which gold has been found, and from the prevalence of dikes in this district it is probable that there have been very interesting exposures.

With one or two exceptions, however, the mines (or prospects) are abandoned and there is no opportunity to make inspections. So far as could be ascertained from specimens and from dump heaps, all the deposits, such as the Means, Arlington, and Wilson, are stringer leads. At the Ferris mine, 5 miles northeast of Charlotte, a little work was going on. This deposit is a stringer lead striking N. 25° E. and dipping 70° to the northwest. The rocks are gneissoid schists and a granite dike, which cuts off the lead. This dike contains fragments of schist and is penetrated by stringers of quartz. The ore contains pyrite and a little chalcopyrite. The development is as yet very slight.

In the neighborhood of Monroe, N. C., there is a group of mines at no great distance from the Haile and Brewer and sharing some of their peculiarities. The Davis, Phifer, Lewis, and Hemby mines are on one belt of rocks 9 miles northwest of Monroe and 2½ miles west of south from Indian Trail. A map showing them is given in Messrs. Kerr and Hanna's Ores of North Carolina. They are all closed. The country rock is mica-schist, striking N. 20° to 40° E. and dipping westward almost vertically. The ores show pyrite, and Kerr and Hanna report some galena. The gold at the Davis is of remarkably low grade and has been known to run as low as 450 thousandths in the presence of galena. The interest of these deposits consists in the fact that they show a commingling of stringer leads and impregnations. So far as the open cuts and dumps enabled me to judge, it seemed to depend upon the character of the rock which form the deposits took, the fissure system being the same in either case. No dikes were seen, but in a field near the Phifer there are numerous large and small fragments of diabase, probably from some dike in the immediate vicinity.

The Bonny Bell and Howie mines are 9 miles west-southwest from Monroe. A portion of the rocks here are sedimentary slates, the schistosity cutting the bedding. There is also some gneissoid rock at the Bonny Bell, and some of the schist is garnetiferous. The schists strike about N. 55° E. and dip 80° or 85° to the northwest. There are dike rocks on the dumps of each mine, and at the Howie both diorite and ophitic diabase are thus found. It is reported that several such dikes were encountered in the underground workings, now inaccessible, and that they cut the schists. The ores are in part stringer belts and in part impregnations with a variable quantity of silica. In some specimens from these mines flakes of gold appear on the cleavage surfaces of the slate without visible quartz, and the slate is so soft as to be easily cut with a knife. Other ores are completely silicified, like the hornstone ores of the Haile mine. Careful inquiries were made to ascertain whether the siliceous ores were richer or poorer than those in which the silicification was insensible, but the men who had worked the mines were unaware of any difference. As miners are very keen in detecting indications which assist them in selecting ore, it may be assumed that the silicification and the impregnation with gold at these

deposits are quasi independent. The ores seen are simple, pyrite being the only sulphide present in sensible quantities; there is some calcite in stringers which may be of later origin than the quartz.

At the Howie there are said to be eight leads within a width of 400 or 500 feet, and the ore is much richer than that at the Haile, large quantities milling on the average $15. The fineness of the gold is reported by Kerr and Hanna as low, between 0.700 and 0.800. Why the Howie is allowed to remain idle I can not say. At the Bonny Bell a small prospecting shaft was being sunk, and a testing mill was in operation.

Near Monroe, as has been mentioned before, a little gold has been obtained from a few weak stringers cutting the Monroe beds. This occurrence is of geological interest, but of no economical importance.

To the northeastward of Indian Trail there are several abandoned mines. Of these the Stuart is of the same type as the Davis and Phifer. The ore at the Moore mine is very peculiar, being characterized by seams, the walls of which are coated with well-crystallized quartz, while the central portion is filled with calcite containing some specks of what is probably siderite. In such veins pyrite and chalcopyrite were observed both in the calcite and in the quartz. The ores also show galena and zinc blende. It was said at this property that the gold obtained came chiefly from the calcite, but no specimens of gold in calcite were to be seen. There are highly decomposed eruptive rocks in the region of these mines.

The Reed, Phœnix, and Rocky River mines lie close together in Cabarrus County. The Reed is famous as the point at which the discovery of gold was made in the South and for the many large nuggets which it has yielded, including the largest found in the United States. This weighed 28 pounds. The Phœnix was for a long time a very prosperous mine and has a peculiar ore. The Rocky River was being worked on a small scale at the time of my visit, but the others have long been closed. At the Reed the rocks are argillaceous slates of westerly dip and a porphyrite. A very large amount of propylitic rock is supposed to belong to this porphyrite, and it is in this decomposed material that most of the quartz stringers seen are embedded. As nearly as could be judged, the contact of the porphyrite and the schist conformed to the schistose surfaces. The stringers in the porphyrite have the same general direction. Many details of this mine in earlier days are to be found in the literature. At the Phœnix not even the strike of the schists could be ascertained at the time of my visit. Most of the country rock on the dumps is a porphyrite containing both hornblende and augite. I was told that nearly all of the ore occurred in this igneous rock. The ore consists of quartz associated with a great deal of barite, siderite, and calcite, carrying iron and copper pyrites. Three or four hundred yards to the eastward of the main shaft there is a highly cupriferous vein, said to be very rich in gold, which has not been worked on account of

the metallurgical difficulties involved. At the Rocky River mine the rocks exposed are muscovite-schists striking N. 20° to 30° E., and dipping 80° to the northwest. A slide of the rock seems to indicate derivation from a porphyrite. The deposits are stringer leads, and those stringers which do not conform to the schistosity almost all pitch more steeply than the cleavages. These also show regular walls. One flat stringer was found showing greatly broken walls, and these relations point to normal faulting, as explained in the section on Structure. The quartzose ore carries iron and copper pyrite and a good deal of galena and some calcite. Barite was reported by the superintendent, but not identified by me. An abandoned shaft called the Buffalo is near the Rocky River and appears similar to it in character.

The dumps of the Pioneer Mills mine, Cabarrus County, which has not been worked since the war, are mainly interesting because they are almost wholly composed of porphyrite, in part propylitic. This rock varies rapidly in texture from coarse to aphanitic. Close by a somewhat schistose, fine-grained, microclinic granite is exposed by the roadside.

The Shuford mine, Catawba County, is more than 30 miles west of Salisbury and might be considered as altogether outside of the Carolinian belt. It is in saprolite and is said to have yielded as much as $100,000. When worked with the pan, by following up pay streaks, it yielded a profit. The attempt to work it by the hydraulic process was a failure, mainly, it seems, because the water had to be pumped—in fact, the mine is at the highest point in the neighborhood. The deposits are small veins which strike about N. 70° E., while the schists, though very irregular, trend on the average at about N. 35° E. Both schists and veins are nearly vertical. There is some intercalated quartz in the schists, but this is said to carry no gold. The veins here are too small to be worked on a considerable scale excepting by the hydraulic process.

The Reimer mine, 6 miles southeast of Salisbury, is open. The rock varies greatly in texture and is much decomposed. It appears under the microscope that the quartzes are in some cases penetrated by muscovite, as if undergoing resolution into silicates. The vein is of variable width, said to average 3½ feet, striking N. 75° W. It is nearly solid quartz, but contains some horse matter. There are also stringers of quartz in the walls. The quartz carries iron and copper sulphurets and is said to average $7 per ton, the clean sulphurets running up to $35 or $40. At the time of my visit preparations were making to treat the ore by the Thies chloridation process.

The Gold Hill mine is at the town of Gold Hill, and is not in operation. The wall rocks are argillaceous slate, not impregnated, so far as could be told from the dumps. The deposits appear to have been stringer leads in this material. The leads strike N. 30° E. and dip 70° to the northwest. Ore chimneys in them are said to pitch about 45° to the southwest. There are three principal leads, 18 inches to 3 feet

in width, at intervals of 300 and 400 feet apart. They are crossed by a diabase dike some 15 feet in width striking to the west of north. The ore contains copper, but no lead or zinc, it is said, and about half of the gold is free. This mine has been more extensively developed than any other in North Carolina.

The Sam Christian is 12 miles east of Albemarle. The property is a large one, but the principal workings are at the "big cut" and at "dry hollow." These are in saprolite. In the big cut, however, a shaft has been sunk on a small quartz vein which strikes 70° W. of N. and dips 60° NE. Evidently such a vein cuts the schistose structure of the country at a large angle. The schists close to the shaft strike N. 20° E., and dip 30° to the NW. The dip is not constant in this region, however, and between the mine and Albemarle the schists were observed dipping alternately eastward and westward. Much of the rock at the mine is clearly sedimentary and shows well-marked bedding, with which the schistose cleavage coincides only in places. These bedded rocks are believed on lithological grounds to belong to the Monroe slates. The shaft, however, is sunk in a somewhat brecciated mass of ancient porphyrite containing quartz and labradorite. This rock is considerably dynamometamorphosed and the ferromagnesian silicates are gone. A part of this material is reduced to hornstone. At the time of my visit I was unfortunately unaware that there is a locality of Emmons's paleotrochis on this property.

The Moratock is an open quarry in volcanic rock 6 miles north of the Sam Christian. It has been sufficiently described in the section on veins and impregnations. This mine, together with the Sam Christian and the Russell, lies along a range of low hills called the Uharie Mountains, and the Hoover Hill lies in the northerly continuation of the same range. It is probable that ancient volcanics enter largely into the composition of these hills, which have not been studied in detail, and which may represent a very ancient range of mountains.

The Russell shows two large open cuts in slate which is in part distinctly bedded and undoubtedly sedimentary. The ore consists of impregnations, with no well-defined fissure system exposed, although stringers of quartz are sometimes visible and calcite accompanies the pyrite in some cases. Under the microscope it is seen that the pyrite is often accompanied by fringes of fibrous quartz microlites, such as were observed at the Haile. The groundmass is made up chiefly of very fine quartz grains, probably accompanied by some feldspar. There are diabase dikes within a mile of the workings, but I saw none at the mine itself.

The Hoover Hill mine, in Randolph County, is 15 miles due north of the Russell. From the dumps it would seem that the quartz formed reticulations in a shattered mass of porphyry. Messrs. Kerr and Hanna describe the deposits as persistent belts of rock abounding in seams of quartz, the distribution of rich ore in the belts being some-

what pockety. The rock is a quartz-porphyrite, seemingly in part tuffaceous; the ferromagnesian silicates have disappeared, excepting some muscovite. At a distance of 200 or 300 yards southeast of the main shaft, at another working, a pyroxene-porphyrite occurs, probably as a dike. It seems to me that the form of this deposit depends largely on the physical condition of the rock, which is not thoroughly schistose. Had it been so, the deposits would have been developed as the stringer leads, so frequent in the State. Some hornstone occurs here, and pyrite, the only sulphuret observed, is found to some extent in the rock, as well as in the quartz.

There is a group of mines in Davidson County, a few miles west of Hoover Hill, where similar rocks appear. At the Jones the rock is very schistose, and the exposures show it in a decomposed state. It seems, however, to have been the same porphyrite met at Hoover Hill. The schists dip deeply to the northwest, so far as I saw them, but E. Emmons mentions them as dipping steeply to the southeast. The rock is charged with sulphurets, and it is said to carry about $2 per ton. Under the favorable topographic conditions of the deposit such ore should pay. The sulphurets themselves are said to go as high as $22.

At the Parish mine there is nothing to be seen. The remarkable actinolite ore has been commented upon in the section on Gangue Minerals.

The Silver Hill, Silver Valley, and Emmons mines, in Davidson County, might be classed as gold, silver, lead, or zinc mines, but as the ores carried up to $10 per ton in gold they are included in this report. The Silver Hill has been more extensively worked than any other mine in the State, excepting the Gold Hill, and many particulars are given in Messrs. Kerr and Hanna's Ores of North Carolina. At the time of my visit all of these mines were abandoned. So far as could be ascertained on the ground, the deposits conform to the general structure of the country, striking to the east of north some 30° and dipping westerly at about 45°. The country rocks are slates, accompanied by eruptives similar to those of Hoover Hill. The eruptive material is highly decomposed and in part schistose, but appears to have been a porphyrite. It is associated with hornstone, such as has so often been mentioned in the description of the Carolinian belt, and at the Silver Hill by a considerable amount of actinolite, such as was found at the Parish, but no gold was seen in this fibrous hornblende. The eruptive rock and the slate both show sulphurets, and quartzose ore was found in direct contact with the porphyry. At the Silver Valley there is a considerable amount of hornstone, and in it sulphurets are distributed on seams which look like shrinkage cracks. The deposits appear to have been closely analogous to stringer leads, but less regularly lenticular than such leads in thoroughly schistose masses. The most abundant sulphuret in these ores was zinc blende, followed in quantity by galena, and the well-known difficulty of treating this

mixture is partly responsible for the closure of the mine. Besides the sulphurets, the stringers carry nearly black chlorite in masses as large as a nut. Mention of other minerals will be found in the table of gangue minerals. Excepting argentite, they are all minerals which might occur in ordinary gold veins carrying trifling quantities of galena and zinc blende.

Why so much lead and zinc should have been deposited at this group of mines is a very important question, to which no answer can now be given. One is accustomed to expect these sulphides in auriferous regions where limestone makes its appearance, but only as a matter of experience for which no distinct reason can be assigned. In this locality, however, there is no known occurrence of limestone. Mining geology is still for the most part in the descriptive stage, and there are few of its phenomena for which sound reasons can be given.

The Burns, Cagle, and Bell mines form a small group in Moore County, well to the east of the Uharie Range and a few miles northwest of Carthage. The Burns shows only open cuts on a belt of auriferous muscovite-schist, which is sometimes much injected with quartz stringers and sometimes not. Sulphurets appear only in portions of the gold-bearing ground, and specimens were seen in which the gold appeared isolated in the schist. The ore is said to contain tellurides, but I saw none. The schists strike N. 20° E. and dip 55° to the northwest. The Cagle is an abandoned mine opened on schists similar to those at the Burns. The deposit was evidently a stringer lead, and a small amount of hornstone was found on the dumps. The Bell mine also is abandoned, and it was difficult to ascertain even the nature of the ore. The material in the ore bin was garnet-schist, which looks like a metamorphosed igneous rock and shows plagioclase under the microscope. According to Messrs. Kerr and Hanna, the ore was a belt of schist silicified and enriched along seams of from one-eighth of an inch to 4 inches in width, forming together a body 4 feet wide and assaying over $12 per ton on the average. At a shaft on this mine the flexure of schists by surface expansion is finely shown. The dip of the schists at the surface is about 45° to the southeastward, or uphill, while at a depth of about 8 feet the dip is 75° to the northwest. The curved laminæ are continuous from the surface of the rock, and the maximum curvature is at about 1 foot beneath the top of the slates. The slates at this point are covered only by a few inches of soil.

The Womble lies about 3 miles northwest of Moncure, in Chatham County. The interest of this excavation lies in the fact that it is in unmistakable Newark (or Juratrias) conglomerate, and that the matrix of this conglomerate is auriferous. The rock forms a portion of an extensive belt of the Newark, which is usually a red sandstone, but at this point contains pebbles as large as a man's head. The pebbles are quartz, granite, schists, and porphyrite; but, excepting the quartz, all of them are decomposed. The pit may measure 100 cubic yards, and

offers irreproachable exposures on its sides. I took material from below overhanging banks and from between the large pebbles, and on panning it I found grains of gold. Of course, this result shows that gold deposition preceded the Juratrias. Just to the north of the Womble there is a mass of porphyrite similar to that of Hoover Hill.

The Portis mine is at Ransom's Bridge, 18 miles east-northeast of Louisburg, and the Mann-Arrington is some 5 miles farther eastward. They are both in an Archean area surrounded by Tertiary deposits and scarcely belong to the Carolinian belt. The schists here strike N. 50° to 60° E., but they dip to the southeastward at angles of 25° to 40°, instead of westward, as is the case with most of the schists on the Carolinian belt. Both mines are idle. The Mann-Arrington dumps show masses of diorite or dioritic gneiss and schists, and the deposit appears to have been a stringer lead of the ordinary type. Both the quartz and the wall rock showed sulphurets. The Portis mine, now called the Sturgis, is a saprolite working, and many nuggets have been found there. Most of the work has been done with nozzles. There seem to be two reticulated veins here. One of them strikes nearly east and west, dipping 25° to the southward. The other is nearly flat and is said to be very extensive. I have met with nothing resembling these reticulated veins elsewhere in the Southern Appalachians, and can only regret that the exposures were too small for satisfactory study. There is a float diabase at this mine, but no dikes were found in place.

In the Carolinian belt the impregnations seem on the whole more valuable than the stringer leads, for they are of greater width. They will be found in all probability along the areas of ancient volcanic rocks, which should therefore be mapped in detail. These impregnations can be cheaply mined, because they are large, and there is little doubt that with prudent management some of them would pay fair returns on invested capital.

XI

SOUTH DAKOTA.

By EUGENE B. BRADEN,
Assayer, United States Assay Office, Helena, Mont.

South Dakota's production of the precious metals for the year 1895 was 229,345.744 standard ounces of gold, of a value of $4,266,897.57, and 117,685.82 standard ounces of silver, of a coining value of $136,943.48, making a total of $4,403,841.05, showing an increase compared with the year of 1894 of 21,432.220 ounces of gold, of a value of $398,935.20, and a gain of 26,290.40 ounces of silver, of a coining value of $30,632.89.

Prospecting for gold has been vigorously carried on during the year, and several new districts have been discovered. Placer mining was not very active owing to the lack of water.

A smelting plant located at Deadwood is of quite a benefit to a large number of producers, this plant being able to smelt at home many refractory ores which will not stand freight to more distant smelting plants.

Tailings from some of the larger plants, which in former years have been going to waste, are now being concentrated and treated at this plant and considerable revenue being saved to the operators.

A large chlorination plant erected during the year at Luma has been found to work successfully some of the ores in the Black Hills country, and will undoubtedly lead to the erection of more plants of this description.

The cyanide mill erected during the year 1894 has been found to treat successfully some of the ores of the Black Hills.

At Lead City is located probably the largest free milling plant in the world, 780 stamps being operated under one management. Everything is worked automatically as far as possible and the cost of mining and milling reduced to a minimum.

The output of the Black Hills during the coming year gives promise of showing a large increase.

The railroads in the district show a disposition to aid the mining public in every way possible by putting in side tracks and building narrow-gauge roads to outlying districts.

TOTAL PRODUCTION OF GOLD AND SILVER IN SOUTH DAKOTA, CALENDAR YEAR 1895.

Metal.	Fine ounces.	Value.
Gold	206,411.170	$4,266,897.57
Silver	105,917.24	136,943.49
Total		4,403,841.06

BULLION OF SOUTH DAKOTA PRODUCTION DEPOSITED AT THE VARIOUS MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING CALENDAR YEAR 1895.

Institution.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
Denver mint	3,449.765	$64,181.67	344.73	$401.13	$64,582.80
Philadelphia mint	14,645.392	272,472.41	136.45	158.78	272,631.19
New York assay office	152,714.803	2,841,205.64	38,452.19	44,744.36	2,885,950.00
Helena assay office	25.011	465.32	2.66	3.09	468.41
Total	170,834.971	3,178,325.04	38,936.03	45,307.36	3,223,632.40

DISPOSITION OF GOLD AND SILVER BULLION OF SOUTH DAKOTA PRODUCTION, CALENDAR YEAR 1895.

	Value.
Deposited at mints and assay offices of the United States, as per preceding table	$3,223,632.40
Other producers in the State shipping to custom smelters and refineries	1,180,208.66
Total	4,403,841.06

XII

UTAH.

By A. HANAUER,
Salt Lake City, Utah.

Utah's production of the precious metals for the year 1895 was 74,820 ounces gold, of a value of $1,546,679, and 8,141,383 ounces silver, of a coining value of $10,525,994; a total of $12,072,673.

Compared with the preceding year, this is a gain of 20,250 ounces gold and 1,607,201 ounces silver, and in value a gain of $2,496,559.

The silver output may be considered as normal, being about the average of recent years—higher than those immediately preceding it, but not equal to the production of 1890 and 1891—while the gold yield shows a large increase over the year before and was the highest on record. The advance in the gold production in recent years has been regular and steady, and single mines now produce more than the entire State (Territory) was credited with but a few years ago.

The output of gold and silver comes almost wholly from old and well-known mines, no new producing mines or districts of importance being in evidence. Prospecting is active and widespread, notably in the vicinity of Mercur, in the Camp Floyd district, which promises largely to increase its yield of gold during the coming year.

RECAPITULATION.

Source.	Gold.	Silver.
	Ounces.	*Ounces.*
Summit County	4,133	3,204,004
Juab County	27,525	3,517,166
Salt Lake County	11,120	775,640
Tooele County	29,300	121,071
Beaver County	712	507,500
Millard County	1,330	900
Washington County	.....	10,102
Miscellaneous shipments from counties not mentioned above	700	5,000
Total	74,820	8,141,383

COMPARISON OF UTAH'S GOLD AND SILVER PRODUCT FOR THE CALENDAR YEARS 1894 AND 1895.

Year.	Gold.	Silver.
	Ounces.	*Ounces.*
1894	54,570	6,534,182
1895	74,820	8,141,383
Increase, 1895	20,250	1,607,201

NOTE.—Of the total output as above given, 35,857 ounces gold and 6,058,192 ounces silver were contained in smelting ores, and 38,963 ounces gold and 2,083,191 ounces silver were milled by various processes. All placer gold is included in the latter item.

WELLS, FARGO & CO.'S STATEMENT OF THE MINERAL PRODUCT OF UTAH FOR 1895.

	Copper.	Lead unrefined.	Silver in bars.	Silver in base bullion and ores.	Gold in bars.	Gold in base bullion and ores.
	Pounds.	*Pounds.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*
Germania Lead Works	952,502	16,930,700	.....	1,722,740	.....	9,753
Hanauer Smelting Works	625,000	8,170,000	.....	777,500	.....	7,800
Pennsylvania Smelting Co	237,400	9,012,390	.....	906,698	.....	7,927
Ibex Mining and Smelting Co	.....	1,531,910	.....	66,577	.....	1,328
Daly Mining Co	.....	68,609	423,001	118,451	.....	70
Ontario Silver Mining Co	.....	612,940	1,285,000	71,413	950	73
Mercur Gold Mining and Milling Co	.....	.....	.....	.....	21,430	.....
Silver Reef district	.....	.....	10,102	.....	.....	.....
Other mines and placers	.....	.....	.....	.....	8,941	.....
Net product bars and base bullion	1,814,902	36,326,549	1,718,103	3,663,379	31,321	26,951
Contents ore shipped	349,855	34,455,700	.....	2,842,322	.....	7,146
Total	2,164,757	70,782,249	1,718,103	6,505,701	31,321	34,097

RECAPITULATION.

2,164,757 pounds copper, at 7 cents per pound	$151,532.99
70,782,249 pounds unrefined lead, at $42 per ton	1,486,427.22
8,223,804 ounces fine silver at $0.6525 per ounce	5,366,032.11
65,418 ounces fine gold, at $20 per ounce	1,308,360.00
Total export value	8,312,352.32

Computing the gold and silver at the mint valuation, and other metals at their value at the seaboard, it would increase the value of the product to $14,519,959.94.

XIII

WASHINGTON.

By CHARLES G. YALE.

From returns received at the San Francisco mint the product of gold and silver in Washington for the calendar year 1895 is shown to be as follows:

Gold	$373,148.05
Silver	141,007.11
Total	514,155.16

The production in 1894 was—

Gold	$232,761.27
Silver	12,520.09
Total	245,281.36

These figures show an increase of gold in 1895 over that of 1894 of $140,386.78 and an increase in silver of $128,487.02, a total increase of $268,873.80.

This increase in both gold and silver is due mainly to the product of some large mining operations in a few of the counties. Since the decline in price of silver a few years since some of the large properties have either been closed down altogether or partially. Meantime search for gold properties has been going on, and such mines have been worked more vigorously. Moreover, much more complete returns were received from the larger companies and the different districts than was the case in the previous year.

Asotin County appears on the records for the first time as a gold producer, the small amount shown having been from placer claims.

Franklin County maintains about the same gold yield as the previous year, all from the mines at Pasco.

Garfield County, which shows a yield of $17,500 this year, did not appear in the statistics at all last year. The yield this year came from mines around Pomeroy and at Pataha City.

In King County the yield of $6,870.77 gold and $3,421.27 silver came entirely from a few mines at Skykomish. This county gave no returns of bullion product in 1894.

Kittitas County shows a total yield for 1895 of $163,040.62, mainly gold; an increase of $90,840 for the year. The largest single producer is the Blewett Gold Mining Company at Blewett, in Peshastin district, the only large quartz mill district in the county. At Cle-Elum the placers did not yield largely, and the main work on the quartz claims

has been development with no production, though the prospects are favorable for another year. The principal producers tributary to Ellensburg are the Swauk placers, about 25 miles distant. The mines at Liberty, while numerous, have few large producers among them. At Mission there are only small mines, and the same may be said of those at McCallum. Neither Peshastin, Teanaway, nor Wenatchee seems to have any large producers.

Lewis County, which did not appear in the records of bullion product in 1894, makes a small showing for 1895 from St. Helens district in the eastern part of the county, where considerable development work is going on.

A Wisconsin company has purchased a number of claims there and will erect reduction works. The recorder of the district states that about 1,000 claims have been located. No free-milling ore has been found; though it all carries gold, the ore is "refractory." The St. Helens district embraces the region at the base of Mount St. Helens.

Lincoln County shows a yield of $27,500 in gold and $5,000 in silver for 1895, while its entire product for 1894 was only $5,789.57. The silver shipments were from mines tributary to Davenport and the gold from the placer mines around Wilbur.

Okanogan County shows a somewhat smaller yield for 1895 than it did for the previous year. The mines at Conconully shipped very little in 1895, and few of them are at work. At Golden nothing but development work was done, except in a few instances. At Loomis, Loop-Loop, and Ruby fewer mines were worked than in the previous year.

Pierce County, which did not appear in the statistics of 1894, shows a yield of $10,000 in 1895, about equally divided between the mines at Buckley and Wilkeson.

Skagit County, which showed a yield of $79,600 in 1894, returned only $23,000 in 1895. The silver mines are all closed and the gold yield is from Anacortes, Marble Point, and Sauk.

Snohomish, which made returns of only $1,000 gold and $500 silver in 1894, shows a yield in 1895 of $42,524.35 gold and $3,900 silver. The gold came from mines around Arlington, Galena, Monte Christo, Sultan City, and Wallace, and the silver from Monte Christo and Skykomish.

The yield of gold in Stevens County in 1894, as shown by the returns received at the mint, was $3,700, while in 1895 the returns show $27,400. The silver in 1894 was $8,800 and in 1895 the returns received amount to $118,500. The main product of silver is from the mines at Colville, Chewelah, Fruitland, and Springdale, where are located the Jay Gould, Old Dominion, Deer Trail No. 2, and Cleveland mines. Some of the mines are comparatively new ones, while others have started up again after a period of idleness.

Whatcom County shows a less yield than in 1894. Slate Creek district is expected to be an important one, though last year it was mainly development work which was done. A great number of prospectors were at work there in 1895 and many claims were located and opened.

Whitman County produced $10,222 in gold in 1895 as against $6,619.70 in the previous year. This yield is mainly from the Hoodoo placers.

The Colville Reservation, recently opened, has attracted a very large number of miners and prospectors, though of course no yield of precious metals can be expected until some work is done on the many claims which have been located.

As to the number of men employed in mining in the State, it is difficult to ascertain with exactness. The numbers engaged in mining in the different counties, as indicated by the returns received at the San Francisco mint, are as follows: Asotin County, 12; Franklin, 23; Garfield, 70; King, 32; Kittitas, 580; Lewis, 150 (mainly prospecting in the St. Helen district); Lincoln, 140; Okanogan, 148; Pierce, 40; Skagit, 48; Snohomish, 53; Stevens, 306; Whitman, 60; Whatcom, 500. Total, 2,164.

In the latter county the large number indicated are said to be at work prospecting and developing claims in Slate Creek district. This enumeration covers only those engaged in regular mining operations. The number of prospectors and men engaged in work on unproductive mines it is impossible to estimate. Many hundreds have gone into the Colville Reservation, for instance, but as yet there is no product for that year.

The rate of wages varies somewhat. In some of the placers in Kittitas County the men get only $2 per day, and the highest paid, according to the returns received, is $2.50 per day. In Okanogan County the average rate is $3, with some instances of $3.50. In Skagit County the rate is $3, as is also the case in Snohomish. In Stevens County $3 per day is paid and in some of the silver mines the rate is $3.50 per day. In Lincoln the rate appears to be $2.25 per day.

BULLION PRODUCTION OF THE MINES OF WASHINGTON, 1895.

RECAPITULATION.

County.	Gold.	Silver.	Total.
Asotin	$3,200.00	.....	$3,200.00
Franklin	9,100.00	.....	9,100.00
Garfield	17,500.00	.....	17,500.00
King	6,870.77	$3,421.27	10,292.04
Kittitas	162,396.23	644.39	163,040.62
Lewis	3,000.00	.....	3,000.00
Lincoln	27,500.00	5,000.00	32,500.00
Okanogan	18,434.70	3,541.45	21,976.15
Pierce	10,000.00	.....	10,000.00
Skagit	23,000.00	.....	23,000.00
Snohomish	42,524.35	3,900.00	46,424.35
Stevens	27,400.00	118,500.00	145,900.00
Whatcom	12,000.00	6,000.00	18,000.00
Whitman	10,222.00	.....	10,222.00
Total	373,148.05	141,007.11	514,155.16

PARTING AND REFINING PROCESSES

By D. K. TUTTLE, Ph. D.,
Melter and Refiner of the United States Mint at Philadelphia.

Gold and silver are not found native in a state of purity. Indeed, they seem to "hunt in couples." Our California nuggets contain, on an average, about 88 per cent gold, the balance being chiefly silver. Native silver has been found more nearly approaching purity; but even this contains enough gold to pay for parting. But by far the largest source of silver is the lead and copper ores of the West, in which it occurs accompanied by gold, in small percentage it is true, but very important in value.

The lead ores are smelted to "base bullion," in which the gold and silver are caught. The lead smelter afterwards carries the concentrating process up to the point of doré bars, which are silver carrying gold as its chief impurity. These bars go to the refinery for parting.

The copper minerals of Montana, Arizona, etc., carry silver and gold, and the electrolytic process of refining the crude copper made from these ores is now an enormous industry. In this process the solution and current are so regulated that only pure copper passes over and is deposited on the cathode, while the original plate—the anode—is disintegrated and the impurities fall to the bottom of the tank as a mud, technically known as "slimes." This mud is a veritable drag net of nearly all the impurities known to the metallurgist, containing, besides gold and silver, notably copper, bismuth, antimony, arsenic, lead, sulphur, selenium, and tellurium. After a more or less successful purification in the copper works, the resulting bullion is subjected to one of the parting and refining processes described below.

Some gold ores are associated with platinum and platiniridium. Iridosmine is rather abundant in the auriferous beach sands of northern California. Dentists' scrap, again, contains platinum, tin, and copper. Jewelers' bars, resulting from the melting down of old jewelry, watch cases, etc. (filled and solid), contain nearly all the metals used in the arts.

It will thus be seen that the material to be treated is of the most heterogeneous description and not unfrequently special methods have to be adopted. Thus, iridosmine is separated from gold by alloying the latter with sufficient silver to so diminish the specific gravity of the molten mass that the heavy iridosmine grains will settle to the bottom of the crucible. The silver and gold are then carefully poured off and *parted by acids*, as hereafter described.

METHODS OF PARTING.

Three general methods are in use for parting gold and silver, known as the "nitric-acid," the "sulphuric-acid," and the "electrolytic" process, respectively. The latter is in use in a few private plants, where it gives satisfaction, but it seems to be better adapted to large smelting works where argentiferous lead is purified than to Government refineries.

The electrolytic process is said to give satisfactory results only when the bullion to be parted has been refined in a cupel furnace until it contains not over 2 per cent of impurities (lead, copper, bismuth, etc.). None of our mints or assay offices can easily be provided with facilities for such wholesale cupelling operations, and the process has therefore been confined, as stated, to lead-smelting plants. It yields silver of exceptional purity (0.999½), and the estimated output of the few concerns using it is some 10,000,000 ounces fine silver per annum. As it is an interesting process from a scientific as well as industrial point of view, a short description may not be amiss before proceeding to deal with the methods in use at the Government institutions.

ELECTROLYTIC PARTING AND REFINING.

The silver carrying gold and a small percentage of impurities is cast from the cupel into flat plates about 18 inches long, 10 inches wide, and one-half inch thick, weighing about 30 pounds each.

These plates form the anodes, and are suspended by three lugs cast on one of the long sides. They therefore hang with the greater length horizontal. Tanks of California redwood planks are very carefully made, 11 feet long by 2 feet wide and 20 inches deep (inside measure). Six partitions are placed crosswise in a tank, so as to give seven separate cells or "baths." In each cell three plates or anodes are suspended, alternating with four cathodes. These latter are thin-rolled sheets of pure silver 13 by 20 by $\frac{1}{32}$ inches thick, weighing 50 troy ounces each. The distance between anode and cathode is about $1\frac{3}{4}$ inches.

Both anodes and cathodes are suspended by conducting wires from copper rods resting on the edges of the tank. Two copper bars traverse these top edges and are conneced with the respective poles of the dynamo. The cross rods supporting the plates rest on these bars, but one end of the rod carrying an anode is insulated by a rubber band, while the opposite end of the rod carrying a cathode is insulated in like manner. The current must therefore pass from one conductor to the anodes, through the solution and the cathodes to the return conductor. It will be seen that the current is divided between these seven cells, and that we have 21 anodes connected in *multiple* with 28 cathodes.

A model plant consists of 14 such tanks, containing 7 cells each. Ten of these tanks are constantly in circuit, four being in turn cut out for charging, discharging, and possible repairs. These 10 tanks are

connected in *series*. The dynamo furnishes a current of 180 amperes, with an electro-motive force of 90 volts. Such a current requires 22 horsepower. The total cathode surface is 10 square feet in each tank. There is therefore a current density of 18 amperes per square foot of cathode surface. This is high as compared with that used in copper refining, but is purposely so, in order that the silver may be deposited in coarse crystals nonadherent to the cathodes. The silver can then be easily brushed off and collected at short intervals. Thus the constant renewal of cathodes is avoided and an important saving effected in the stock of silver carried in the baths.

Each anode is inclosed in a muslin bag, which serves to catch the undissolved metals which fall as a black slime. In this are found all the gold and bismuth, the greater part of the lead as peroxide, together with some silver and copper. Below this system of anodes, cathodes, and bags in the bath is stretched on a box-like frame a piece of cloth on which is gathered the deposited silver as it is scraped from the cathodes by wooden "brushes." These brushes straddle the cathodes without touching, and are kept moving to and fro by machinery, and they serve not only to brush off the silver as fast as it is deposited, thus preventing short circuits, but also to keep the solution uniform by gentle agitation.

The solution is one of silver and copper nitrate, to which about 1 per cent of nitric acid is added. The acid tends to prevent the deposition of copper with the silver, and about 1 pint is added to each bath every twenty-four hours. Three-eighths of 1 volt will decompose silver nitrate, while copper nitrate requires $1\frac{1}{6}$ volts, and lead nitrate a still higher voltage.

In a slightly acid solution, containing silver, copper, and lead nitrates, the current will not deposit a trace of anything but silver until the lead and copper get to be largely in excess of the silver. It is said that pure silver will be deposited from a solution containing one and one half times as much copper as of silver. Of course the gradual accumulation of impurities in the bath necessitates its gradual renewal by addition of fresh solution, the silver being precipitated from the portion withdrawn by salt water.

Each tank is cleaned of deposited silver every other day, and of gold slimes once a week. A full-sized anode is dissolved in about two and one-half days. The crystalline silver is washed thoroughly with hot water, dried, and melted. The gold slimes are melted, granulated, and parted by acid.

Such a plant as described will produce about 33,000 ounces of fine silver each twenty-four hours.

ACID-PARTING PROCESSES.

Acid-parting processes depend upon the solubility of silver, copper, etc., in an acid which will not attack the gold. Strong sulphuric (oil

of vitriol) is such an acid, and nitric acid is another, but their mode of action and the apparatus required are quite different. The use of each will be described in detail.

THE NITRIC-ACID PROCESS.

This is the oldest and until a comparatively recent date the only method in use for parting gold and silver. The first notice we have of its use on a large scale was in the fifteenth century, and proved a very profitable one, by some Germans at Venice, who employed it in extracting gold from Spanish silver, keeping their art a secret. They acquired with their wealth the title of "gold makers" by their mysterious operations.

Parting by nitric acid is conducted on a large scale much in the same manner as an assay of gold bullion is made in the laboratory. It consists of the following operations:

(1) Assorting and proportioning the bullion; (2) granulation of the same; (3) solution of the silver in acid; (4) treatment of the gold residue; (5) precipitation of the silver as chloride; (6) reduction of the chloride by zinc; (7) washing, drying, and melting the parted metals.

It is of course desirable that the bullion should be approximately free from base metals other than copper. Tin, antimony, and arsenic are especially objectionable, the two former not being soluble in nitric acid. They give insoluble oxides, which remain behind with the gold and must be removed in the crucible by suitable oxidizing fluxes. Copper, on the other hand, acts as a substitute for silver in the parting process, being, as it is, readily soluble in nitric acid. When silver deposits are scarce, therefore, such as contain considerable quantities of copper, whether of gold or silver, are not undesirable, although the copper requires more acid for solution than the silver which it replaces.

It was originally thought that the proper proportion for parting was three parts silver to one of gold, hence the name "quartation" given to the process. Experience has shown, however, that a lesser proportion of silver is quite as effective, and that the copper may be considered as silver for parting purposes. The proportion of gold to silver (and copper) used at the Philadelphia mint is 1 to $2\frac{1}{2}$.

The necessary calculations having been made, the deposits are assorted into melts of about 4,000 ounces each, preferably by mingling gold and silver deposits. If the latter are not on hand in sufficient quantity, fine silver is substituted. The "melt" is now brought to fusion in a large crucible, thoroughly mixed, and then by means of a dipping cup is poured into cold water from a height of some 3 feet. The cup is given a peculiar swirling, wavy motion, by which means the thin stream of molten metal is broken up when it strikes the water into leafy granules and hollow spheres, not unlike golden popcorn in appearance—this to expose as much surface as possible for the action of the acid. These granulations are dissolved in porcelain vessels of about

33 gallons capacity. Twelve such vessels are placed in a large water bath in what is called the "parting house." Provision is made for heating the water surrounding the jars, and a connection from the top of the house to a chimney serves to carry off the acid fumes.

Each jar receives a charge of 190 pounds of granulations and 175 pounds strong nitric acid. When the first strong action has subsided, steam is admitted to the water surrounding the jars. The metal and acid will about half fill the jar. At intervals of twenty minutes the contents are thoroughly stirred with a wooden paddle, the doors on the side of the house being raised for the purpose. The charge is kept boiling gently during six hours, by which time most of the silver will have been dissolved, leaving the gold as a granular sediment. The steam is turned off from the bath, and hot water added to the jars to dilute the strong silver solution. After subsidence of the gold, the clear solution, containing silver, copper, lead, etc., is siphoned off and transferred to the precipitation tank. The jars are again filled with hot water, the contents well stirred, and again allowed to settle. The clear liquid is added to the first, and 50 pounds of fresh, strong acid added to each jar. The boiling is renewed for five or six hours, when washing of the gold by decantation is several times repeated. The gold sediment is now transferred to a lead-lined tub, mounted upon a truck. This tub has placed in it a perforated false bottom, which is carefully covered with cotton cloth, the whole constituting a large colander or movable filter. Water is now passed through the gold until most of the silver has been removed, the wash waters being transferred, as before, to the large tank for precipitation.

From this filter the gold is transferred to cast-iron pots, in which it receives a boiling in strong sulphuric acid, to which a small quantity of niter is added. This treatment extracts an additional portion of silver and materially increases the fineness of the gold. The strongly acid liquor is ladled off into vessels partly filled with water. From this solution the silver and a little gold are periodically recovered as "residues." The gold is thrown from the iron pots into water, washed a number of times by decantation, and then thoroughly sweetened on a portable tub filter, such as has been described. It is now dried and melted. If a sample bar, upon trial, proves to be tough, the melt is now ladled into iron molds, giving bars of some 300 to 400 ounces each. If the trial bar is brittle, the molten mass is fluxed with niter through an "eye" of bone ash. The niter oxidizes lead, antimony, arsenic, sulphur, etc., the products being absorbed by the bone ash cover.

About 6,000 ounces constitutes such a melt, and we have some fifteen bars of a fineness of 0.998 or 0.999, and worth, say, $8,000 each.

RECOVERY OF THE SILVER.

The silver solutions, together with the wash waters from the gold treatment described, are transferred to a large precipitation tank, *having a capacity* of some 2,000 gallons. This is never filled to its full

capacity, since abundant room must be left for stirring and rousing the contents. Salt water is now run into the silver solution until a test shows that enough has been added to convert all silver present into chloride. An excess is avoided, since silver chloride is slightly soluble in salt water. The contents of a large tub are now drawn off through a filter. This is a wooden tank 6½ feet long, 3 wide, and 1¼ in depth, lead lined, and provided with a perforated false bottom. The bottom and sides of this tank are carefully covered with cotton cloths as a filtering medium. The curd-like silver chloride is run into this filter through a large wooden stopcock. The liquid which drains off is returned to the filter until it runs clear, after which it is passed through several traps to the sewer. Fresh water is passed through the chloride until all soluble matters are removed, when it is allowed to drain. The filter tank is mounted on low wheels for convenience of moving the chloride to the reducing vat. This is again a lead-lined rectangular tank. The silver chloride is transferred to this tank by means of a copper scoop shovel. Hot water is run on, and granulated zinc added in sufficient quantity to reduce the chloride to metallic silver. The addition of sulphuric acid hastens the action and serves to dissolve the slight surplus of zinc which it is necessary to use to insure complete conversion into metallic silver. The reduced silver is now taken out with a copper scoop having a shovel handle and put into a filter colander, such as was described previously when speaking of gold treatment. In this colander the silver is washed with hot water until entirely sweet. It is now ready for compression into solid cakes by hydraulic pressure. These cakes are dried in a current of hot air, when they are ready for melting. This is usually done without fluxes, and the resulting bars have a fineness of 0.998 to 0.999.

THE SULPHURIC-ACID PROCESS.

Thoroughly satisfactory as is the nitric-acid process, so far as its effectiveness is concerned and the high grade of gold and silver which it yields, yet the comparatively high price of nitric acid and the necessity of using either platinum or porcelain vessels led to its being superseded in modern plants by the sulphuric-acid-parting process. Diluted sulphuric acid has no action on silver, but the strong acid, when heated, is decomposed by that metal, giving off sulphurous acid and forming silver oxide, which passes into solution in the excess of acid as silver sulphate. If gold is present in moderate percentage, say not to exceed one-third of the whole, strong sulphuric acid will extract the silver and leave the gold as a granular brown sediment. Should the bullion contain anything like one-half gold, the latter metal will protect the silver against acid attack and the result will be failure. It is therefore the business of the refiner to adjust for the melting pot gold deposits with those of silver carrying small quantities of gold, or, failing such, to add fine silver so as to have from two to three parts of silver for each

part of gold. Such an admixture is melted in a large crucible, thoroughly mixed, and then, with a "dipping cup," is poured into cold water, as described in speaking of the nitric-acid process.

But the proper adjustment of silver to the gold is not the only point requiring care. Most bullion coming to the refinery contains varying quantities of copper, and this metal works very badly in strong sulphuric acid, although we found that metal the least objectionable one in the nitric-acid treatment. While decomposing the acid with formation of copper sulphate, this latter, unlike the silver sulphate, is insoluble in oil of vitriol. Hence, if present in any considerable quantity, copper soon acts as a protector to the bullion, and the chemical action either ceases or becomes tediously slow. Besides apportioning the silver to gold, it is necessary, therefore, to so combine deposits that the granulations do not contain more than 6 to 8 per cent of copper.

DISSOLVING THE SILVER.

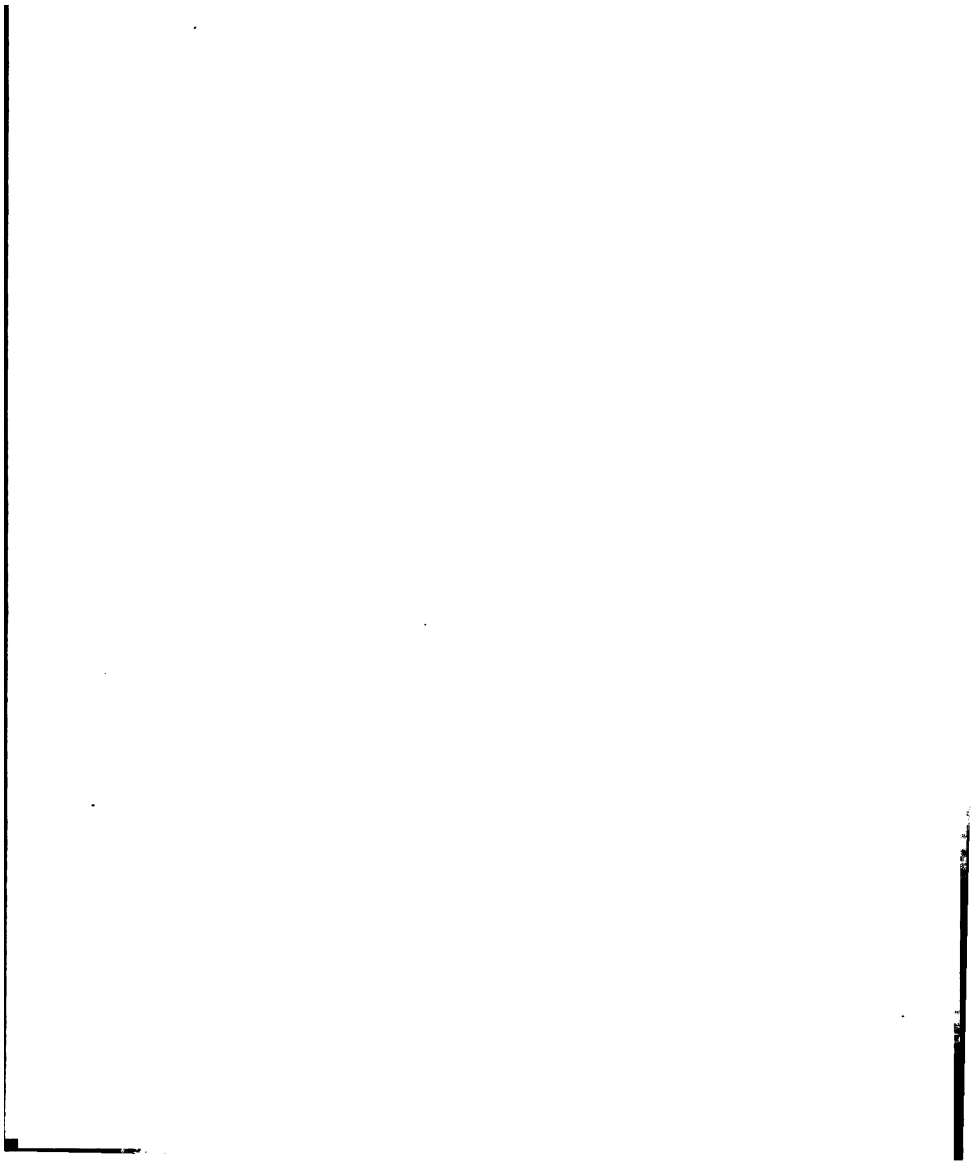
The success of this beautiful process really depends upon the happy observation that while weak sulphuric acid rapidly dissolves iron, yet, if the acid be strong enough, it has no appreciable action—just the reverse of its relations to silver. Cast-iron vessels may therefore be employed. A cast-iron kettle will last for years, during which time hundreds of tons of silver may be dissolved in it by boiling oil of vitriol. Large iron kettles are used, weighing half a ton, mounted over a furnace. Into this a charge of 300 to 400 pounds of the granulated bullion is placed, and covered with three or four times its weight of acid—66 B. Heat is applied, when a lively evolution of sulphurous acid sets in, which, if too violent, must be checked by the addition of a little cold acid and slackening of the fire. This boiling is continued for several hours, during which time the escaping and consumed acid is gradually replaced. When the solution is complete, the fire is withdrawn and the contents of the kettle allowed to quietly settle. A little cold acid is added to aid the precipitation of any suspended gold. Hoods over the kettles carry off the fumes to condensing and suppression apparatus.

The strongly acid solution, while still hot, is siphoned off into the "reducing houses." These are long, rectangular vats lined with lead, and provided with sloping covers like the roof of a house. These covers are hinged to what would be the ridgepole, and are counterbalanced so as to be easily raised. Slabs or ingots of metallic copper are placed on the bottom and sides of these vats, which are then partly filled with cold water. The hot silver solution is then run in. A lively commotion ensues, as will readily be imagined when one recalls the heat evolved by the mingling of cold oil of vitriol with water. In this case the acid is nearly at its boiling point, which is greatly above that of water, and the resulting crackling and spluttering must be seen to be appreciated. The result is a weak solution of silver sulphate, rendered

milky by the separation of fine crystals of that salt, the solubility of which is very slight in pure water. The copper immediately begins to precipitate the silver as a beautiful crystalline moss, easily detachable from the plates when the operation is complete. This requires about twenty-four hours. Meanwhile the copper has taken the place of silver, and we have now a strong solution of copper sulphate (blue vitriol). This blue solution is drawn off for crystallization and the spongy silver carefully transferred to leaching tubs for thorough sweetening with fresh water. The silver, now in the form of minute, flaky crystals, is compacted into cakes by means of hydraulic pressure and these cakes dried in a current of warm air, after which a simple fusion in a black-lead crucible without fluxes gives a bullion .998 or .999 fine. If silenium or tellurium is present in the bullion it will pass into solution with the silver and be deposited with it by the copper plates. In this case the spongy silver will be dark colored and the melt will be brittle. It must then be fluxed with niter.

The sulphate of copper is a staple article of commerce and is carefully prepared for the market. When sold, the proceeds should materially reduce the expense of parting the bullion. But, unfortunately, while the materials for its production, the acid and copper, are purchased out of the fund arising from the collected charges from the depositor, yet the product, blue vitriol, is by present ruling treated as "waste product," the proceeds from which, when sold, must be turned into the general Treasury instead of the refinery fund.

We left the gold as a sediment in the large iron dissolving kettle. A small quantity of fresh acid is added and the gold then removed to a smaller vessel by an iron ladle, perforated with holes. It is transferred to another iron pot, in which it receives a number of repeated boilings with fresh strong acid. There are not less than five such boilings. The finishing acids are siphoned off and used upon fresh charges of bullion. The gold is now transferred to a tub, in which it is washed first with cold water and then with hot. These washings find their way to the silver-precipitating tanks. It is now transferred to a lead-lined vat mounted upon a truck. This vat has a perforated false bottom, which is carefully covered with cloth, the whole constituting a large movable filter. Water is now passed through the gold in this filter until it is entirely sweet. If the gold is in coarse particles it may be dried and melted without danger of its being mechanically carried off while placing it in the crucible, but if very fine it is compacted into cakes, while wet, by hydraulic pressure. These cakes are dried as were those of silver, in a current of warm air, and melted in a graphite crucible. A trial sample is taken to see if the metal is tough. The presence of even small quantities of lead will render the gold brittle, in which case it is fluxed with niter through an "eye" in a cover of bone ash. When tough, it is ladled into iron molds. About 6,000 ounces constitute such a bar melt. The bars are worth about *$8,000 each.*



PART II.

PRODUCTION OF GOLD AND SILVER IN FOREIGN COUNTRIES.

PRODUCTION OF GOLD AND SILVER IN FOREIGN COUNTRIES.

AFRICA.

According to the Report of the Witwatersrand Chamber of Mines the total gold output of the Transvaal during 1895 was 2,505,412 ounces 4 pennyweights, of a declared value of £8,577,550, contributed as follows:

	Ounces.
Witwatersrand	2,277,640
De Kaap	63,046
Lydenburg	63,506
Klerksdrop	90,841
Zoutpansberg, etc.	9,550
Malmani	829
Total	2,505,412

SUMMARY.

Witwatersrand	2,277,640
Other districts	227,772
Total	2,505,412

The average fineness of the South African gold, as ascertained by this Bureau from Sir C. W. Fremantle, deputy master of the royal mint, London, is 0.847½, which makes its value per ounce $17.5194. The total product of South Africa in 1895 of 2,505,412 ounces crude therefore represents 2,123,337 ounces, or 66,044.69 kilograms, fine, of the value of $43,893,300.

"In June," says the Report of the Chamber of Mines, "the output of the Witwatersrand for the first time exceeded 200,000 ounces, and in August it exceeded 203,000 ounces. The setback since then has been due to several causes, chief of which was the failure to keep the supply of native labor up to the demand, the shortage increasing as the year drew to a close. Although, however, not so great as anticipated at the beginning of the year, there has still been an appreciable increase in the output during the past twelve months.

"In the other districts of the Transvaal, in spite of the greater activity in mining and prospecting operations, the output shows a decline as compared with 1894. This decline was due to the diminished production of the Sheba Company, which was in large measure owing to

an accident to the machinery, which seriously curtailed the work for four months.

"Since work commenced on the Witwatersrand the total production has amounted to 8,858,039 ounces 8 pennyweights. In arriving at this total an allowance of 42,000 ounces has been made, this being the estimate for unrecorded production during the years 1887, 1888, and 1889. The following table shows the production from year to year:

TOTAL GOLD PRODUCTION OF THE WITWATERSRAND.

	Ozs.	Dwts.
1887	23,125	8
1888	208,121	14
1889	369,557	5
Estimated unrecorded production 1887, 1888, and 1889	42,000	0
1890	494,817	0
1891	729,268	6
1892	1,210,868	16
1893	1,478,477	3
1894	2,024,163	12
1895	2,277,640	4
Total	8,858,039	8

"The increase for the year has been 253,476 ounces 12 pennyweights, and would have been larger but for the short fall in native labor supply, already referred to. Last year the principal source of increase was the gold extracted from tailings, the advance under that head having been greater than that derived from milling operations, due in considerable degree to the treatment of the tailings accumulated during previous years. This year, however, the tonnage dealt with corresponds closely with that resulting from millwork, and the yield from the mills again takes the lead in contributing toward the aggregate increase.

"The average number of stamps running per day was 2,546, against 2,273 in 1894, being an increase of 273 stamps, while, owing to the more general use of heavier stamps, the effective crushing power per stamp was raised to the extent of 0.42 ton per day. On the other hand, the mills ran for 2.23 days less than in the previous year, the figures being 331.81 days in 1895 and 334.04 in 1894. The tonnage of ore dealt with shows an advance of 629,210 tons, with a resulting increase in gold production of 196,215 ounces 1 pennyweight, equal to 9.69 per cent. The average mill yield was less than last year by 0.54 pennyweight per ton; but the extraction from tailings improved, and the total yield per ton by milling and retreatment process remains practically unchanged at rather over 13½ pennyweights per ton. Tailings show an increased tonnage of 82,494 tons, and an augmented yield of 51,343 ounces 17 pennyweights, the figures having been, for 1894, 2,674,673 tons, 587,888 ounces 14 pennyweights; for 1895, 2,757,167 tons, 638,732 ounces 11 pennyweights. From concentrates, the tonnage of which is not given, the increased yield was greater by 26,817 ounces 4 pennyweights. Preparations have been made for the treatment of slimes, of which a great quantity has been accumulated during

the past year, and in the coming year the yield from this source will add to the total extraction.

"Other sources, again show a decline, the falling off under this head for 1895 having been 19,934 ounces 2 pennyweights. This simply means that the heaps of "tailings" worked last year by private persons have diminished, and that gradually all the gold produced in this district is being declared direct to the chamber, the amount declared by the banks as received from 'other sources' having been only 25,886 ounces 19 pennyweights for 1895, against 45,821 ounces 1 pennyweight in 1894. During the past year no alluvial gold was produced on the Witwatersrand.

The following is the summary of increases and decreases during 1895:

INCREASES.

	Ozs.	Dwts.
Mill	196,215	1
Tailings	51,343	17
Concentrates	26,817	4
Total	274,376	2

TOTAL INCREASE.

	Ozs.	Dwts.		
Less decreases from "other sources"	19,934	2		
From alluvial	965	8		
			20,899	10
Net increase			253,476	12

OTHER INCREASES.

Mill	tons..	629,210
Tailings	do....	82,494
Average number of stamps dropping per day		273
In efficiency of stamps per day	tons..	0.42
In yield per ton of tailings	pennyweight..	0.25

OTHER DECREASES.

Mill yield per ton	pennyweight..	0.54
Days milling during year		2.23

"The other districts of the Transvaal show a net decrease of 13,917 ounces 8 pennyweights, for which the short fall in the output of the Sheba Company is mainly responsible. In the following districts the increases and decreases obtained were:

Increases—	Ozs.	Dwts.
In Klerksdrop	13,126	15
In Lydenburg	3,231	0
In Malmani	335	0
Total	16,692	15

Decreases—	Ozs.	Dwts.		
De Kaap	29,531	3		
Zoutpansberg, etc	1,079	0		
			30,610	3
Net decrease			13,917	8

STATEMENT SHOWING WEIGHT AND VALUE OF RAW GOLD EXPORTED FROM SOUTH AFRICA, CAPE COLONY, AND NATAL DURING 1895, AS SUPPLIED TO THE CHAMBER BY THE RESPECTIVE COLLECTORS OF CUSTOMS.

Month.	Cape Colony.		Natal.		Total.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.
	Ounces.		*Ounces.*		*Ounces.*	
January	195,781	£672,964	4,454	£15,588	200,235	£688,552
February	176,147	605,089	5,480	19,184	181,627	624,273
March	159,843	542,173	5,682	19,887	165,525	563,060
April	159,614	546,830	2,842	9,946	162,456	556,776
May	198,460	678,007	6,197	21,691	204,657	699,698
June	185,928	640,297	5,439	19,036	191,367	659,333
July	196,586	679,749	5,317	18,608	201,903	698,357
August	233,670	806,342	6,937	24,281	240,607	830,623
September	199,989	687,026	3,880	13,579	203,869	700,605
October	218,024	757,114	5,469	19,142	223,493	776,256
November	193,650	669,579	3,880	13,575	197,539	683,154
December	200,199	689,467	2,602	9,106	202,801	698,573
Total	2,317,900	7,975,637	58,179	203,623	2,376,079	8,179,260

The following table shows the export of native gold from Witwatersrand by the banks (the Standard Bank, Bank of Africa, the National Bank, the African Banking Corporation, the Natal Bank, and the Robinson South African Banking Company) during 1895:

Month.	Native gold exports.	Total value.
	Ounces.	
January	167,962.30	£584,872
February	163,298.54	577,223
March	151,062.86	533,907
April	172,510.16	598,023
May	162,527.75	567,382
June	185,697.64	658,633
July	229,999.99	803,051
August	185,806.53	668,696
September	213,994.80	734,931
October	171,673.05	600,825
November	185,313.08	648,261
December	212,334.40	732,559
Total	2,202,181.10	7,708,356

(From the Seventh Annual Report of the Witwatersrand Chamber of Mines, December 31, 1895, page 172–176.)

SOUTH AFRICA.

STATEMENT SHOWING THE GOLD OUTPUT DURING 1895.

[From the Seventh Annual Report of the Witwatersrand Chamber of Mines, South African Republic, 1896, pp. 181, 188.]

Month.	De Kaap gold fields.	Klerksdorp district.
	Ounces.	*Ounces.*
January	6,091.745	9,092
February	5,903.418	9,051
March	3,402.070	8,747½
April	2,646.174	8,570½
May	3,940.923	8,413
June	3,130.174	7,094
July	3,743.192	8,202
August	5,339.064	7,174
September	6,089.402	6,488½
October	8,001.113	5,732
November	7,601.798	6,055½
December	7,141.181	6,635½
Total	63,030.854	91,206½

THE RESULTS OF THE GOLD-MINING INDUSTRY OF THE SOUTH AFRICAN REPUBLIC IN THE YEAR 1895. [1]

[By M. Francke, of Barberton, Transvaal.]

The amounts of ore taken from the mines in 1894 and 1895, as shown by the official statistics of the Republic, are given in the following table:

TABLE I.

Gold district.	Ore raised.	
	1894.	1895.
	a Long tons.	*a Long tons.*
Witwatersrand	3,062,767	3,917,078
Heidelberg	25,618	32,641
Schonspruit	182,448	231,340
Malmani	387	2,915
De Kaap	113,963	80,968
Zoutpansberg	26,613	19,816
Lydenburg	71,568	86,249
Vryheid	5,500	5,484
Carolina	150	260
Pretoria	.....	391
Total	3,489,014	4,377,142
Increase	.....	888,127

a One English ton equals 1,016.048 kilograms.

[1] Translated from Glückauf, Berg-und Hütten-männische Wochenschrift, Essen (Ruhr), May 2, 1896, p. 345, etc.

The work done in the ore-dressing establishments is shown in the following tables:

TABLE II.

Gold district.	Ore stamped in the mills.				Concentrates.			
	Total.		Per stamp and per day.		Produced.		Quantity shipped.	
	1894.	1895.	1894.	1895.	1894.	1895.	1894.	1895.
	Long tons.	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*	*Long tons.*
Witwatersrand	2,871,395	3,501,697	3.716	4.086	26,074	40,359	.....	.....
Heidelberg	25,614	29,294	2.805	3.166	.....	.....	.....	.....
Schonspruit	183,389	214,222	4.557	4.423	.....	.....	.....	.....
Malmani	387	1,659	1.106	1.929	.....	.....	.....	.....
De Kaap	95,443	50,420	1.966	1.970	1,002	605	702	361
Zoutpansberg	27,358	21,583	2.963	2.925	175	6	.....	.....
Lydenburg	63,968	79,970	3.021	3.520	127	.....	.....	.....
Vryheid	1,798	3,864	6.915	3.209	135	656	.....	.....
Carolina	80	250	1.067	1.389	.....	.....	.....	.....
Pretoria	30	374	938	3.937	.....	.....	.....	.....
Total	3,269,462	3,903,333	3.627	4.009	27,573	41,626	702	361
Increase	.....	633,871	.....	382	.....	14,113	.....	.....
Decrease	.....	.....	.....	.....	.....	.....	.....	341

TABLE III.

Gold district.	Concentrates.						Tailings.			
	Gold contents per ton of quantity shipped.		Quantity.		Average gold contents per ton.		Quantity.		Average gold contents per ton.	
	1894.	1895.	1894.	1895.	1894.	1895.	1894.	1895.	1894.	1895.
	Ozs.	*Ozs.*	*Long tons.*	*Long tons.*	*Ozs.*	*Ozs.*	*Long tons.*	*Long tons.*	*Ozs.*	*Ozs.*
Witwatersrand	.....	.....	24,134	34,312	3.159	2.898	2,772,730	2,863,868	0.233	0.240
Heidelberg	.....	.....	.....	.....	.....	.....	28,954	50,656	.886	.471
Schonspruit	.....	.....	.....	.....	.....	.....	145,488	171,841	.236	.253
Malmani	.....	.....	.....	.....	.....	.....	2,070	3,248	.278	.196
De Kaap	6.796	7.019	247	66	6.090	5.848	90,817	63,180	.627	.601
Zoutpansberg	.....	.....	42	.....	1.788	.....	.....	.....	.....	.....
Lydenburg	.....	.....	.....	.....	.....	.....	39,496	56,449	.535	.389
Vryheid	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Carolina	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pretoria	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	6.796	7.019	24,423	34,378	3.185	2.904	3,079,555	3,209,242	.255	.254
Increase	.....	.223	.....	9,955	.....	.....	.....	129,687	.....	.....
Decrease	.....	.....	.....	.....	.....	.281	.....	.....	.....	.001

In order to understand some of the above tables it must be remarked that as a rule all the ore raised is sent to the mills to be stamped. The sump of the stampers runs out of the mortars over amalgamated plates on which the combination of the free gold with the amalgam takes place. While the slimes in most instances run off into the slime tanks and there deposit the tailings, in many ore-dressing establishments they

are conducted over apparatus of various kinds and different construction, in which the particles containing gold in combination are precipitated in consequence of their high specific gravity—mostly on woolen cloths or other similar material—and are there held. These particles, which are comparatively rich in gold, constitute the concentrates.

Next to the absolute increase of the ore stamped the work done per stamp and per day is of interest, showing an average increase of more than 10 per cent, thus bearing witness to the improved technics of the stamping mills.

The fact that the quantities of concentrates produced do not agree with the quantities shipped and worked is explained by the fact that they are to a large extent sent to special establishments to have the gold extracted from them.

The most important data from an economic point of view, i. e., the data of the gold product of the Transvaal, are contained in Table IV.

The increase of production in 1895 over 1894 was 11.4 per cent.

For the purpose of comparison the following table of the production of gold in the Transvaal for the years 1884–1895 is given:

TABLE A.

	Ounces.		Ounces.
1884	2,918	1891	835,516
1885	1,737	1892	1,289,498
1886	10,032	1893	1,575,397
1887	48,960	1894	2,239,865
1888	279,600	1895	2,494,487
1889	430,800		
1890	540,360	Total	9,749,170

The decline of alluvial gold production finds precise expression in Tables IV and V. There was an increase of alluvial production only in the district of Lydenburg. The alluvial gold production in 1893 amounted to 3,705 ounces.

The yield per ton of ore, and therefore the value of a ton, shows a perceptible decline, but it can not be inferred therefrom that there has been a deterioration of the ore, because a good and thoroughly intelligent management of the production of the ores may be carried to such an extent that the gold contents of the latter may still somewhat exceed the cost of the production of gold.

TABLE IV.—GOLD PRODUCTION FROM ORES MINED.

Gold district.	From the mills.							
	Output.				Value.			
	Total.		Per ton.		Total.		Per ton.	
	1894.	1895.	1894.	1895.	1894.	1895.	1894.	1895.
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*			£ s. d.	£ s. d.
Witwatersrand	1,294,539	1,494,090	0.451	0.427	£4,664,542	£5,383,540	1 12 6	1 10 9
Heidelberg	28,118	21,334	1.098	0.728	98,419	74,737	3 16 10	2 11 0
Schonspruit	45,031	41,560	0.246	0.194	157,130	146,233	0 17 2	0 13 8
Malmani	118	367	0.305	0.221	379	1,160	0 19 7	0 14 0
De Kaap	46,603	36,721	0.488	0.728	175,230	139,435	1 16 9	2 15 4
Zoutpansberg	10,223	8,077	0.374	0.374	36,689	29,891	1 16 10	1 7 8
Lydenburg	32,452	33,172	0.507	0.415	111,242	113,788	1 14 9	1 8 6
Vryheid	.....	470	.....	0.122	.....	1,656	.....	0 8 7
Carolina	12	38	0.163	0.152	44	135	0 11 0	0 10 10
Pretoria	6	316	0.200	0.845	23	1,097	0 15 4	2 18 8
Total	1,457,103	1,636,135	0.446	0.419	5,243,707	5,891,672	1 12 1	1 10 2
Increase	.....	179,032	.....	.....	.....	647,965	.....	.....
Decrease	.....	.....	.....	0.027	.....	.....	.....	0 1 11

Gold district	From concentrates.							
	Output.				Value.			
	Total.		Per ton.		Total.		Per ton.	
	1894.	1895.	1894.	1895.	1894.	1895.	1894.	1895.
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*			£ s. d.	£ s. d.
Witwatersrand	83,411	105,390	3.456	3.072	£315,653	£382,621	13 1 7	11 3
Heidelberg	.....	88	.....	.....	.....	177	.....	.....
Schonspruit	.....	.....	.....	.....	.....	.....	.....	.....
Malmani	.....	.....	.....	.....	.....	.....	.....	.....
De Kaap	985	422	3.988	6.394	2,956	1,200	11 9 4	18 3
Zoutpansberg	75	.....	1.788	.....	300	.....	7 2 10	.....
Lydenburg	.....	.....	.....	.....	.....	.....	.....	.....
Vryheid	.....	.....	.....	.....	.....	.....	.....	.....
Carolina	.....	.....	.....	.....	.....	.....	.....	.....
Pretoria	.....	.....	.....	.....	.....	.....	.....	.....
Total	84,471	105,900	3.459	3.080	318,909	383,998	13 1 2	11 3
Increase	.....	21,429	.....	.....	.....	65,089	.....	.....
Decrease	.....	.....	.....	.379	.....	.....	.....	1 17

TABLE V.—GOLD PRODUCT FROM ORES MINED.

Gold district.	From tailings.									
	Output.				Value.					
	Total.		Per ton.		Total.		Per ton.			
	1894.	1895.	1894.	1895.	1894.	1895.	1894.		1895.	
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*			£ s. d.		£ s. d.	
Witwatersrand	570,973	623,480	0.206	0.218	£1,734,586	£1,926,849	0 12 6		0 13 6	
Heidelberg	24,567	22,227	0.848	0.439	73,921	64,499	2 11 1		1 5 6	
Schonspruit	33,327	49,291	0.229	0.287	107,594	158,653	0 14 10		0 18 6	
Malmani	376	462	0.182	0.142	1,497	1,848	0 14 6		0 11 5	
De Kaap	39,048	25,277	0.430	0.400	117,360	76,191	1 5 10		1 4 1	
Lydenburg	26,334	28,588	0.667	0.506	56,772	54,863	1 8 9		0 19 5	
Total	694,625	749,325	0.226	0.233	2,091,730	2,282,903	0 13 7		0 14 3	
Increase		54,700		0.007		191,173			0 0 8	

Gold district.	Total.				Gold product from alluvial occurrence.			
	Output.		Value.		Output.		Value.	
	1894.	1895.	1894.	1895.	1894.	1895.	1894.	1895.
	Ounces.	*Ounces.*			*Ounces.*	*Ounces.*		
Witwatersrand	1,948,924	2,222,960	£6,714,781	£7,693,010	1,015	106	£3,387	£361
Heidelberg	52,685	43,649	172,340	139,413				
Schonspruit	78,358	90,841	264,724	304,886				
Malmani	494	829	1,876	3,008				
De Kaap	86,635	62,420	295,555	216,826	848	626	3,043	2,312
Zoutpansberg	10,298	8,077	36,989	29,891	313	649	1,115	2,248
Lydenburg	58,786	61,760	168,014	168,651	1,490	1,746	5,261	6,061
Vryheid		470		1,656				
Carolina	13	38	44	135				
Pretoria	6	316	23	1,097				
Total	2,236,199	2,491,360	7,654,346	8,558,573	3,666	3,127	12,806	10,982
Increase		255,161		904,227				
Decrease						539		1,824

Gold district.	Total gold production.			
	Output.		Value.	
	1894.	1895.	1894.	1895.
	Ounces.	*Ounces.*		
Witwatersrand	1,949,939	2,223,066	£6,718,168	£7,693,371
Heidelberg	52,685	43,649	172,340	139,413
Schonspruit	78,358	90,841	264,724	304,886
Malmani	494	829	1,876	3,008
De Kaap	87,483	63,046	298,598	219,138
Zoutpansberg	10,611	8,726	38,104	32,139
Lydenburg	60,276	63,506	173,275	174,712
Vryheid		470		1,656
Carolina	13	38	44	135
Pretoria	6	316	23	1,097
Total	2,239,865	2,494,487	7,667,152	8,569,555
Increase		254,622		902,403

Of the processes employed in the extraction of gold from concentrates and tailings, the cyanide process, in its different variations, plays the principal part, as is apparent from Tables VI and VII.

TABLE VI.—CONCENTRATES TREATED BY THE CYANIDE PROCESS.

Gold district.	Quantity.		Average gold contents.		Output.			
			Per ton.		Total.		Average per ton.	
	1894.	1895.	1894.	1895.	1894.	1895.	1894.	1895.
	Tons.	*Tons.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*
Witwatersrand	11,094	19,492	2.206	1.520	25,960	38,760	2.340	1.989
Heidelberg								
Schonspruit								
Malmani								
De Kaap	247	66	6.090	5.848	985	287	3.988	4.348
Lydenburg								
Total	11,341	19,558	2.291	1.535	26,945	39,047	2.376	1.996
Increase		8,217				12,102		
Decrease				.756				.380

Gold district.	Value.			
	Total.		Average per ton.	
	1894.	1895.	1894.	1895.
			£ s. d.	£ s. d.
Witwatersrand	£83,561	£113,753	7 10 8	5 16 9
Heidelberg				
Schonspruit				
Malmani				
De Kaap	2,956	861	11 19 4	13 0 11
Lydenburg				
Total	86,517	114,614	7 12 7	5 17 2
Increase		28,097		
Decrease				1 15 5

TABLE VII.—TAILINGS TREATED BY THE CYANIDE PROCESS.

Gold district.	Quantity.		Average gold contents.		Output.			
			Per ton.		Total.		Per ton.	
	1894.	1895.	1894.	1895.	1894.	1895.	1894.	1895.
	Tons.	*Tons.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*
Witwatersrand	2,741,973	2,670,612	0.233	0.243	563,525	588,598	0.206	0.220
Heidelberg	28,954	50,656	.886	.471	24,567	23,227	.848	.459
Schonspruit	145,488	171,841	.236	.253	33,327	49,291	.229	.287
Malmani	2,070	3,248	.278	.196	576	462	.183	.143
De Kaap	90,817	63,180	.627	.601	39,048	25,277	.430	.400
Lydenburg	39,496	56,449	.535	.399	26,334	28,588	.667	.506
Total	3,048,798	3,015,986	.255	.258	687,177	714,443	.225	.237
Increase				.003		27,266		.012
Decrease		32,812						

TABLE VII.—TAILINGS TREATED BY THE CYANIDE PROCESS—Continued.

Gold district.	Value.								
	Total.		Per ton.						
	1894.	1895.	1894.			1895.		
	Ounces.	*Ounces.*	*Oz.*	*dwt.*	*grs.*	*Oz.*	*dwt.*	*grs.*
Witwatersrand	1,706,038	1,808,680	0	12	5	0	13	6
Heidelberg	73,921	64,499	2	11	1	1	5	6
Schonspruit	107,594	158,653	0	14	10	0	18	6
Malmani	1,497	1,848	0	14	6	0	11	5
De Kaap	117,360	76,191	1	15	10	1	4	1
Lydenburg	56,772	54,863	1	8	9	1	19	5
Total	2,063,182	2,164,734	0	13	6	0	14	4
Increase	.....	101,552	.....			0	0	10
Decrease	.....	.....	.....			.....		

It will be noticed that there is a slight difference between the total production of South Africa as given by the Witwatersand Chamber of Mines (2,505,412 ounces crude) and that shown by the official statistics of the Transvaal Republic. As in previous years, this Bureau adopts the figures of the Chamber of Mines, which are considered more complete than those of the Government.

WEST COAST OF AFRICA.

The figures given at the beginning of this article relate only to the gold product of the Transvaal, but may be taken to represent the output, not only of the South African Republic, but of the whole of Southern Africa, for the present yield of Natal and Cape Colony is insignificant, not amounting, probably, to 1,000 ounces of crude gold.

The gold yield of the West Coast, however, is worthy of more attention, as will be seen from the following table of the gold thence exported to great Britain in the years named:

TABLE SHOWING THE GOLD IMPORTED INTO ENGLAND FROM THE WEST COAST OF AFRICA DURING THE YEARS 1889–1895.

Year.	Weight.		Value.	Kilograms.
	Ounces, standard (.916⅔).	Ounces, fine.		
1889	44,554	40,841.17	$844,262	1,270
1890	37,242	34,138.50	705,705	1,062
1891	45,212	41,444.33	856,730	1,289
1892	53,402	48,951.83	1,011,924	1,523
1893	34,286	31,429.00	649,695	977
1894	30,326	27,798.83	574,653	865
1895	34,916	32,006.33	661,630	995

Adding the production of the Transvaal to the production of the West Coast of Africa thus obtained gives the following:

TABLE SHOWING THE TOTAL PRODUCTION OF GOLD IN AFRICA FOR THE YEARS 1889–1895.

Year.	South Africa.		West Coast.		Total.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.
	Kilos.		*Kilos.*		*Kilos.*	
1889	11,719	$7,788,372	1,270	$844,262	12,989	$8,632,634
1890	15,706	10,438,356	1,062	705,705	16,768	11,144,061
1891	22,398	14,885,639	1,289	856,730	23,687	15,742,369
1892	34,938	23,220,108	1,523	1,011,924	36,461	24,232,032
1893	42,573	28,298,831	977	649,695	43,550	28,943,526
1894	59,730	39,696,330	865	574,653	60,595	40,270,983
1895	66,045	43,893,300	995	661,630	67,040	44,554,930

The following table shows the monthly returns of the gold yield of the Witwatersrand for the past six years, as supplied by the Johannesburg Chamber of Mines:

RAND GOLD PRODUCTION, 1890–1895.

Month.	1890.	1891.	1892.	1893.	1894.	1895.
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*
January	35,030	53,205	84,569	108,374	149,814	177,463
February	36,886	50,079	86,640	93,252	151,870	169,295
March	37,680	52,949	93,244	111,474	165,372	184,945
April	38,799	56,372	95,502	112,053	168,745	186,333
May	38,884	54,673	99,436	116,911	169,773	194,580
June	37,412	55,864	103,252	122,907	168,162	200,941
July	39,452	54,924	101,280	126,169	167,953	199,453
August	42,861	59,070	102,322	136,069	174,977	203,573
September	45,467	65,602	107,852	129,585	176,707	194,764
October	45,251	72,793	112,167	126,682	173,378	192,652
November	46,795	73,794	106,795	138,640	175,304	195,218
December	50,352	80,313	117,749	146,357	182,104	178,426
Total	494,869	729,638	1,210,868	1,478,473	2,024,159	2,277,635

Concerning the production of gold in the Transvaal in 1895 as compared with that of 1894, Professor Lexis, of Göttingen, says:

The increase of the gold product of the South African Republic in 1895 over that of 1894 is relatively the smallest in the whole series of years beginning with 1895, and is very far from meeting the great expectations of the stock exchange speculations, which in 1895 led to so large an increase in the course of mining shares. The majority of rich mines now worked will be exhausted in ten years, and when it is considered what great quantities of gold, judging from past experience, they will at best be able to yield, it becomes immediately apparent that there is a very noticeable disproportion between their real values and the quoted values of their shares during the fall of 1895. The crash of November 9, 1895, caused a great decline of the quoted values of the shares of the mining companies, but doubtless many of them are still quoted too high.

From August, 1895, to the close of the year there was a marked decrease in the production of the Witwatersrand, especially in December, when owing, it is said, to a lack of workmen only 178,428 ounces were produced, against 203,573 in August. In consequence of political events the production in the early months of 1896 has also decreased, but to conclude from this that the period of greatest production of this remarkable conglomerate deposit has been passed would be premature. It is probable, however, that the annual yield will hereafter show only a moderate growth, even should the mines be worked with ever-increasing intensity. In all the important mines the region of the pyrites has already been reached, and it is owing solely to the MacArthur-Forrest process, or the various other modifications of the cyanide process, that their output has not been smaller still. Besides, the large masses of accumulated tailings which were turned to account in recent years by that process have now been for the most part treated, so that the unusual increase made to the production from this source will henceforth stop. In 1893 the gold got from the tailings was no less than 20 per cent of the gold product of the Witwatersrand. If we add to this the gold extracted from the concentrates containing the pyrites by means of the cyanide process, there was obtained in this way from July 1, 1892, to June 30, 1893, in the Witwatersrand district an output of 7,032 kilograms, or 28 per cent of the total yield of 40,844 kilograms. It is said that in some mines the proportion was as high as 35 to 50 per cent. As to the continuance of the gold wealth in the depths of the trough formed by the conglomerate beds of the Witwatersrand, it must be said that the experience hitherto had with the deep-level mines is not altogether encouraging, although a decisive judgment on this point is not yet possible. It is, however, a bold hypothesis to assume that the reefs preserve the same average thickness and the same average gold contents throughout their whole extent as at the outcrop. For the part of the trough that has been already sufficiently examined, Schmeisser calculates, on the hypothesis above referred to, a gold contents to the depth of 800 meters (2,625 feet) of 4,289,000,000 marks ($1,020,782,000), and to the depth of 200 meters (656 feet) a gold contents of 7,187,000,000 marks ($1,710,506,000). If the annual product should increase for ten years more by the same amount on an average, as from 1888 to 1893, and then remain constant, the former estimated contents would be exhausted in twenty-five years and the latter in forty years.

Although these figures are very uncertain, it may be claimed that the output of the Witwatersrand for many decades more will average at least as large as that of 1895, especially as the above estimates relate only to a part of the Witwatersrand trough and do not take into consideration the other districts capable of development, of which the De Kaap district is the most promising. We are here, of course, concerned only with the gross gold output of the mines; whether they pay their individual owners is another question. It is probable that the average net profit of the capital invested in them will at no distant period decline more and more in consequence of the increasing cost of production, but this will not lessen the intensity of the work of mining.

There is no doubt that in the territory of the South African Company, in Mashonaland and Matabeleland, rich alluvial deposits as well as auriferous quartz lodes are to be found. This is proven by the traces of old workings discovered—of mines which may have been operated by the Arabs or Phœnicians. It has not yet been possible to work these mines because of the lack of water, the dearness of all articles required, and other difficulties.

SKETCH OF THE GEOLOGICAL FEATURES OF THE DE KAAP GOLD FIELDS, BEING A SPECIAL REPORT PREPARED BY THE MINE INSPECTOR FOR THE BARBERTON INSPECTION FIELD, R. VAN GEMBER.

[From the annual report of the State mining engineer of the South African Republic for the year ending December 31, 1894.]

The geological formations of the De Kaap gold fields may be divided into three groups, viz:

(1) That of the granite. (The placing of the granite in a special group seems excusable in the present instance on account of its great importance to these gold fields, and also because its position in relation to other groups is not yet determined.)

(2) That of the steeply inclined sedimentary strata classified by Dr. Schenck under the name of "Swazie formation."

(3) That of the sedimentary strata deposited more or less horizontally, denominated by the same geologist as the "Cape formation." The granite, which constitutes the basis of the entire formation, appears on the surface in the northern part of the district over large areas. It also forms nearly the whole country between the North Kaap and Crocodile rivers, extending beyond the last-named river and occupying the districts of the Nelspruit, the Blinkwater, and the Sicazi rivers, finally disappearing at the ranges of hills situated in front of the Spitskop under the sedimentary strata of the Lydenburg district. The granite further occupies the whole of the valley to the south of the South Kaap River, and also covers a considerable portion of the hilly country found to the north of this river, extending about south of a line drawn between Barberton and Kaapsche Hoop. This granite is only covered by an isolated layer of sedimentary strata in the corner of ground lying between the North and South Kaap rivers.

The granite itself belongs to the common gray variety, and has generally a medium-sized grain, but also often occurs porphyritic, especially in the neighborhood of the Gladdespruit and Nelspruit, its structure being usually massive, although in places it assumes a gneiss-like appearance.

The aforementioned granite base lying to the south of the Crocodile River (the portion of it lying to the north need not be considered, since it does not lie within the district) is surrounded by sedimentary strata, namely, on the western side by the Cape formation and on the southern and eastern sides by the Swazie formation.

The Swazie formation commences at about the source of the South Kaap River, extending in a slightly curved line, which is open toward the north, to Barberton, and from there on continues northward to the junction of the North and South Kaap rivers, thereafter following the Kaap River. From the point where Rimers Creek joins the South Kaap River the formation also extends over the left bank of the South Kaap River, at which place they form the already-mentioned layer of sedimentary strata lying between the North and South Kaap rivers. This layer may perhaps be regarded as the remains of strata which had formerly covered the whole territory lying on the southern side of the North Kaap River.

The total thickness of this sedimentary formation is very considerable. It occupies the whole district between the Kaap River and the Komatie, and also extends into the Komatie gold field and Swaziland, being only again replaced by the granites south of Steynsdrop. The rocks constituting this formation consist of the argillaceous shales, mica schists, quartzitic, sandstones, quartzites, and conglomerates, which rocks have frequently been metamorphosed and altered into phyllite, talcose, chloritic, and sericiric schists. As to the distribution of these rocks, I am so far not in a position to give any reliable information. It appears, however, in going from north to south, that the quartzitic rocks and the conglomerates more generally prevail, the latter especially being almost entirely wanting on the northern side of the watershed above Barberton, between the Komatie and the Kaap River, while to the south of it, between the Groote and Klein Komatie, as well as in the valley of the Umzoli, they play an important part in the composition of the formation.

The formation, as already mentioned, is upheaved at high angles, and consists of a system of synclinals dipping southward at angles varying from 70 to 90 degrees and having an easterly and westerly strike. In some localities, as, for instance, at the Ivy mine, an anticlinal formation occurs. In the immediate neighborhood of Barberton, however, the formation has a northerly and southerly strike and dips to the east.

The mountain ranges formed by these deposits slope at very steep angles into the valley, the highest elevation above it being about 700 meters (2,300 English feet).

The strata of the Cape formation, which forms the boundary of the granite on the west, lies more or less horizontally, and rests at Kaapsche Hoop immediately on the granite, forming a ridge of hills with a northerly and southerly strike, and may connect with the strata of the same age in the Lydenburg district. The rocks of this formation consist principally of quartzitic sandstones and conglomerates.

In regard to the correlation of the different groups of rocks I have not as yet been able to make sufficient observations, owing to my short residence in the district and the want of suitable open workings. A proper explanation of this relationship is, however, of great importance to many mines, particularly to those situated along the boundary of the sedimentary deposits toward the granite, especially when their outcrops are not greatly elevated above the valley, since there can be hardly any doubt that the ore deposits discontinue in the granite or in any case pinch out very rapidly on entering it.

It may be inferred from the fact that the sedimentary formation near Barberton has a different strike and shows no disturbance at its contact with the granite that the latter was already in existence before the folding of the strata and the formation of fissures resulting therefrom. Should this prove so, it may in such case be taken as a favorable indication that no disturbance of the formation through the upheaval of the granite is to be feared. In the case of those mines which are situated along the edge of the sedimentary formation the inclination of the granite escarpments is a matter of importance.

With regard to the sedimentary deposits it has been proved by observations at other places that the Cape formation is unconformable to the underlying Swazie formation.

Besides the rocks already referred to, a large number of eruptive rocks are found in the De Kaap district, especially greenstone varieties, such as diorites and diabases. In many localities also intrusive granite occurs in fissure veins. The eruptive rocks break through the granites, as well as sedimentary deposits, in many ridges, and may be arranged into two classes, namely, those traversing the rock formations in more or less northerly and southerly direction and those having an easterly and westerly strike. In the latter case they are often found traveling in an almost parallel direction to the inclosing sedimentary rocks, and are then related to the ore veins hereafter described.

Little is known of the economic mineral-bearing value of the rock formations other than that which relates to their gold-bearing value. It may, however, be mentioned that other ores are known to occur, especially the manganese ores, such as psilomelane, and iron ores, such as hematite. It is also said that in places asbestus has been found. A detailed description of the gold-bearing deposits must be reserved for a later report, since up to the present time I have had no opportunity to closely study the whole formation. I shall therefore confine myself to some of the general characteristics only.

The gold ores occur principally in so-called "reefs," although in several places, especially in the Kaapsche Hoop, a considerable quantity of alluvial gold has been found, the production of which, however, as compared with that obtained from the "reefs," is insignificant.

Gold "reefs" are found to occur in all the three groups of formations mentioned.

The granite is traversed by numerous quartz veins, which in many places were proved to carry gold. Although these veins may in some places have considerable

extent, mining upon them has never been of any importance, nor is it likely to be, since they are narrow, poor, and pinch out very rapidly.

The gold "reefs" occurring in connection with the sedimentary strata are of far greater economic importance, those of the Swazie formation ranking first. These schists constitute the mother rock of numerous gold-bearing deposits occurring in slate belts running between the different quartzite and conglomerate beds, generally lying entirely within the slates, but sometimes between the boundary of quartzite and slate, sometimes of greenstone and slate.

Two classes of gold "reefs" may be distinguished in relation to their connection with the surrounding rock formation, namely, those which are more or less conformable and those which are unconformable to it. The latter traverse the formation in different directions, generally, however, at more or less right angles to it. Most of the best-known gold-bearing "reefs" belong to the first class. With regard to these the question has been raised as to whether they are bedded or true fissure veins. The investigations I am making into this subject are not as yet concluded, but it seems to me beyond doubt that, owing to the occurrence of numerous ramifications and leaders which branch off but again join the main body, at least a portion of these "reefs" are true fissure veins.

As a rule the gold "reefs" are distinctly defined and separated from the inclosing "country rock," but are also found associated with it. The matrix of the gold "reefs" sometimes consists of pure quartz, generally, however, of a mixture of quartz and schistose matter. In most cases the latter even predominates, the quartz occurring in the shape of stringers, reticular masses, or irregular bunches.

The color of this quartz is generally white, gray, or bluish black, rarely reddish, its structure being glassy, crystalline, and sometimes of a quartzitic nature. As a rule it is impossible to derive any practical conclusions from the external appearance of the quartz; that is, as to whether it is favorable or otherwise to the occurrence of gold. Some such deduction may, however, be made with quartz occurring in the same mine, or even more so in the same "shoot." Thus the value of the quartz may in such places be often determined with certainty from its external appearance. For instance, in the Sheba mine it is found that the black quartz with a greasy luster is rich in gold, while glassy-looking quartz always proves poor.

THE SCHISTOSE PORTION OF THE MATRIX OF THE GOLD-BEARING "REEFS."

The kind of schistose gang matter found in the veins is generally of a similar nature to that of the "country" rock, but is frequently much metamorphosed by the impregnations of mineral solutions.

In these deposits the gold occurs in two different forms; that is, as free gold or associated with pyrites.

The manner in which the free gold occurs, oxidized products not being considered, is essentially different from the manner of its occurrence in the Witwatersrand district, where the gold is for the most part originally associated with pyrites, and is only finally liberated and becomes fine gold by the action of weathering, whereas in the De Kaap district it is evident from the manner of its occurrence that the gold was originally deposited in the metallic state, occurring in this form in the pure, thin, ribbon-like bands and flat plates, which vary in thickness from a piece of paper up to 10 millimeters (3⅛ inches); also in irregular-shaped patches.

The vein stuff carrying the free gold is usually quartz, excepting in such cases as it has been weathered out from pyrites. Auriferous pyrites usually occur as impregnations of the schistose portion of the veins, but are also found in the quartz. Sometimes these pyritic impregnations pass into and constitute an important portion of the "country" rock, so that this latter can also be advantageously mined. Pyrites also occur in massive veins without suffering from any important impoverishment in their gold yield.

The distribution of the gold in the strata is, as a rule, found to be richer in the so-called "shoots." These "shoots" usually pitch in toward the east and have a

dip varying from 30 degrees up to the vertical and a length of from a few up to more than 75 meters.

Although it is not always possible to determine the dimensions of a "shoot" from its appearance only, but has to be done with the assistance of practice and sampling, still some conclusions as to the existence of a "shoot" may be derived from the outer appearance of a vein. Thus its increased width, greater prevalence of quartz, and the appearance of free gold may all be taken as characteristic indications. Outside of the "shoot" free gold is seldom met with, being usually associated with pyrites. Moreover, the quantity of pyritic matter and its gold yield at such places are of lower grade.

Those portions of the veins which lie outside the "shoots" are usually not worked, since most of the mines have no proper arrangements for the treatment of pyrites. The high rate of freight for their shipment renders this also prohibitive, except in the case of highly concentrated and rich products.

Further, the production of clean concentrates is not only attended with considerable expense, but also by great losses, if, as was generally the case in this district, the plant for the treatment of tailings were altogether wanting or of an unsuitable nature. I am, however, convinced that a large portion of the veins situated outside the "shoots" could be mined profitably, if economically mined and suitable plants for the treatment of concentrates and tailings were to be provided.

In relation to the average gold yield of the veins no general deductions can be made, since it varies so considerably at the different mines. It may, however, be stated that as a rule with those mines actually in work the yield of the "shoots" varies from 1 to 3 ounces of gold to the ton, although at some mines it has been found to go as high as 6 ounces to the ton.

It is also impossible to give any particulars as to the average yield of gold in the pyrites, as this will largely depend upon the quality of the pyrites. They are, however, usually richer than those which occur in the Witwatersrand district. According to data placed at my disposal, they may be said to average about 5 ounces of gold to the ton, although at some mines the yield runs up to as much as 13 ounces.

The important question relative to the extension of the strata laterally and clinically, or, in other words, the life of the mines in this district, can not be estimated by any general rules, but must be determined according to the conditions which prevail in each separate case after a close investigation of the geological conditions. In many cases also these examinations must be preceded by further geological exploration work.

In other respects the conditions are not unfavorable. Thus in considering the question of the horizontal extension of the strata it can be traced for miles on the surface, while as to the no less important one of its extension in depth, comparing the conditions with those of similar known formations in other countries and considering, moreover, the great horizontal extension of the strata as already mentioned and the fact that in the more developed mines the conditions in these respects are not found to be any worse, there is no reason to believe that they will run out rapidly. Great disturbances, which are so frequently the cause of unprofitable mining, are also seldom encountered in this district.

The occurrence of gold in the Swazie beds is entirely different from that in "Cape" formation, as represented at Kaapsche Hoop. In this place the gold is found in weathered and decomposed loamy masses, as a rule in the "hanging wall," but sometimes in contact with the greenstone veins. Often these masses are apparently altered considerably by contact metamorphism before being decomposed. Perhaps this metamorphism may have prepared the rock for the following decomposition: The gold occurs in a form similar to the so-called leaders, sometimes recalling those found at Spitzkop. The gold-bearing strata are generally recognized by their striking yellow color.

Over what area this peculiar strata extends is not positively known, but, considering

the numerous places often situated far from each other where this strata has been found, an important extension of it may be expected.

According to my opinion, also, a part of the deposits worked to-day as alluvial ground are to be considered as decomposed deposits on their primary strata. Gold-bearing conglomerates varying in thickness up to 10 meters are also to be found in the Kaap formation extending over large areas, but owing to their low-grade nature and irregularity in the occurrence of gold no work has yet been carried out upon them.

In conclusion I may shortly set forth the prospects of gold mining in this gold field.

The progress of this industry is chiefly dependent on two questions:

(1) Is it to be expected that still further payable ground will be discovered?

(2) Can it be assumed that many of the known properties at present not being worked will be profitably worked in the future?

From the numerous prospecting works, more especially those in the neighborhood of the De Kaap Valley, it would at first appear that the whole country had been thoroughly prospected, but that owing to its poverty it had been abandoned as worthless.

On a closer inspection of these works, however, it will be found that many of them have been injudiciously carried out, frequently even without the slightest mining judgment. In other cases the work has been stopped too soon. On this account, seeing the "shooty" nature of the ground, it can not be concluded that because no rich strikes have been made therefore no payable reefs exist. For instance, in the course of the year in many places previously abandoned rich strikes have been found on the recommencement of work.

In other cases again good payable deposits have been abandoned, since the ores, carrying a small amount of free gold, did not show up well in the pan or the arrangements for treating it were of such a primitive nature that ores of moderate yield did not prove payable. Thus it has been proved that ore carrying more than 15 pennyweights of gold to the ton was left standing as worthless which is now being worked profitable.

I am personally convinced that, taking into consideration the great extent of already proved payable reefs, the discovery of others may yet be expected. To attain this end, it is only necessary that a judicious selection of places for the prospecting work be first made and that it be properly carried out, sufficient capital being provided to thoroughly test the ground.

The question as to which of the already known reefs will be likely to repay any further development work is to be decided separately in every individual case, the geological and local conditions being taken into consideration.

It is true that the mines in this district so far have labored under great disadvantages as compared with those of the Witwatersrand, more especially in connection with transport difficulties and the costly nature resulting therefrom of all machinery, tools, materials, stores, etc., and, above all, of coal.

These difficulties will be largely reduced by the completion of the branch railway line. Some difficulties, due to the mountainous nature of the ground, will in many cases always exist, but may be greatly minimized by laying out the mine and surface works properly. Further, since the problem of transmitting electricity has been solved, obstacles arising out of distances or the heavy nature of the ground will in most cases cease to exist as a factor presenting any difficulty to the mining of precious metals.

The difficulties of mining in the De Kaap district having thus been largely overcome, the natural advantages which this district has over the other gold fields of this country will always remain.

First and foremost of these must be mentioned the possibility of working the mines by means of adit levels and the utilization of the abundant supply of water power.

This mining district appears as if created for working by a system of adit levels.

Thus instances are by no means rare where by driving a comparatively short distance up to 400 meters (1,300 feet) of "backs" are made available for exploitation.

Cheap transport in the mine, natural drainage, simple ventilation, ample and well situated sites for plants and "bewaarplaatsen," and sometimes in addition valuable water power, are the advantages derived from such a system of working. "Down from the hills and out of the narrow creeks into the main valleys" is a fitting admonition for many mine properties in this district. The great initial cost of such mining work will soon be repaid by the previously mentioned advantages, together with the more extended duration of life of the mines, due to being able in this manner to work poorer portions of the gold-bearing deposits. It will be an important matter for the legislature to consider in what manner it can promote the interest of such a system of mining by permitting adit levels to be driven through the ground of others, provided always that the owners of intervening territory are indemnified.

A further great advantage to the district is undoubtedly the abundance of water power. Thus, not taking the smaller sources of power into consideration, several thousand horsepower can easily be supplied by the Quees's, De Kaap, and Komatie rivers and can be transmitted by means of electricity to places where it is required.

How best to make use and take advantage of the such natural advantages is the main factor upon which the progress of the mining industry in the De Kaap gold fields rests.

It is true that a large amount of capital will be required in order to drive these adit levels and to utilize the water power, and that such expenditure can not be undertaken by the proprietors of small properties. It will therefore be necessary either to amalgamate the different scattered properties or that they cooperate together with a view of carrying out such enterprises. One single adit level, as already stated, and one installation for the supply of water would thus suffice for several mines.

Possibly the formation of such cooperative companies might be protected and supported by Government by special laws. For instance, in this manner in Germany in the "Gewerkshaftsrecht" there exists a special law applying only to mining companies, which has been in operation for several centuries with the best results, and which has even lately been taken as a model for laws of a similar nature.

For the State the formation of such cooperative companies would have the advantage that they would be largely deprived of the speculative element and partake more of a safe and lasting investment.

ARGENTINA.

No report of the production of gold and silver in Argentina in 1895 has been received by this Bureau, and it is therefore assumed to have been the same as in 1894, viz, 143 kilograms of gold and 37,334 kilograms of silver.

The following account of the precious metal mining industry of the Argentine Republic is extracted from a report of United States Consul E. L. Baker, at Buenos Ayres, on the commerce, finance, and industries of that country, published in Volume L, No. 187, of the United States Consular Reports (April, 1896):

MINING INDUSTRY.

There is very little to be said, as usual, in regard to mines and mining in the Argentine Republic. It is the same old story; there are mining camps and establishments in the interior provinces. In some instances expensive works have been erected and large amounts of money invested, but the output has been next to nothing.

Not one of the gold or silver mines of the country has thus far paid expenses. Of late I have heard of extensive movements on the head waters of the Chubut River in Patagonia, where at least two companies are now working; also promising reports of the Hall mines in Neuquen territory, and disclosures of great expectations of the gold and silver mines in the province of San Juan; but I do not put much faith in any of them.

I find the following article in the Review of the River Plate of January 11, translated from the Nacion, which very truthfully gives the present condition of the mining industry of the Argentine Republic:

"It is to be regretted that, although we have positive evidence that we possess the true basis of a great mining future, we have not been able to secure the investment of sufficient capital to develop the industry properly. Notwithstanding this there is considerable animation all the time in the mining districts throughout the Andine provinces and the national territories, where several companies are engaged in mining enterprises in spite of the difficulties caused by high freights and the fall in the value of silver, which only permits the export of mineral of very high assay.

* * * * * * *

"Various companies are nevertheless working silver and copper which contain alloys of silver, gold, and galena, and extracting the metals at their own establishments with good results, especially in the provinces of Rioja, San Juan, and Mendoza; but owing to the rise in the value of copper more attention is being paid to these mines, since nearly all our auriferous quartz contains at the same time silver and gold in considerable quantities, which fact explains why, although copper has fallen so much in price in the last few years and in spite of the long distances by cart and rail to the seaboard and subsequent export to Europe, the working of these mines has never ceased, more especially in Rioja, where a good interest has been earned on the capital invested. At the present time, owing to the scarcity of pack mules in that province, the rich and important mines of the district of Famatina can not be worked as actively as they might, and this is the more to be regretted since if only the Dean Funes to Chilecito route were to be finished for the short distance that remains from Patquia to Chilecito it would be easy to take up all the machinery necessary to wake that immensely rich district into feverish activity.

"At the present moment, and owing to the enthusiasm for gold mines which has seized the public in Europe lately, the discovery and development of our mines is being contemplated by many, and we hear that two large syndicates are now being formed for the purpose of exploiting mines in the provinces of San Juan and Mendoza. At the same time one or more companies are being formed for the purpose of working the gold mines of Cordoba.

"In the national territories of Neuquen and Chubut also there are three companies, formed with capital of the country, actively occupied in putting up extensive plants for the working of gold washings, and their properties have been duly marked out by the national department of mines and geology, which department has received numerous applications for claims, which will be attended to early in the year. Various applications have been made to the same department asking for claims for quartz mining in the same district of Neuquen, which are to be worked with Chilean capital by persons who have mining interests in Chile.

"There is incontestible evidence, therefore, that in the whole length and breadth of the Cordillera and its spurs, right away down to Terra del Fuego, there are immense auriferous zones, and if our capital has not been drawn toward them it is because there are so many easier and very lucrative investments to be had nearer home, besides which the immense distances of the mining regions and the difficulties of transport have caused those districts to be almost unknown in this city. Now, however, that land speculations, railway investments, etc., are not so easy or so profitable, there are signs of attention being drawn to the mining industry, and there is no doubt that as soon as any faith in the business is established we shall see great activity in the Andine provinces in mining and other allied industries.

"It is therefore the more necessary for the miner, as well as for other parties interested in the development of this important industry, to endeavor to bring it into good repute and for the companies to proceed with every precaution so as to avoid failure. Moreover, seeing that the mining industry is as yet almost in a nascent condition, there is no necessity for capitalists to touch any doubtful properties or schemes, as they have a vast field in which by careful and competent study they can work with a certainty of brilliant results which they can not do in older countries."

I have uniformly expressed the opinion that there will some day be great discoveries of the precious metals in the regions of the Andes Mountains, but there has not as yet been any scientific exploration of those slopes, and until that is accomplished I fear that the mining boom of the Argentine Republic must be remanded to the indefinite future.

AUSTRALASIA.

Under date of March 9, 1896, Hon. Robert Barton, deputy master of the Melbourne mint, wrote this Bureau:

I have the honor to inclose a statement showing the quantity of gold and silver produced in Australasia during 1895, according to the estimates furnished by the governments of the various colonies, expressed in gross ounces.

The statement is as follows:

I.—GOLD.

	Ounces.
New South Wales	360,165
New Zealand	293,491
Queensland	623,000
South Australia	[1]47,343
Tasmania	59,964
Victoria	740,086
Western Australia	231,513
Total	2,355,562

II.—SILVER.

	Ounces.
New South Wales	[2]550,142
New Zealand	85,024
Queensland	[2]223,759
Victoria	50,647
Total	909,572

It has been the custom of this Bureau to estimate Australasian gold as 0.920 fine; making the deduction of 8 per cent, leaves Australasia, in 1895, a net gold product of 2,167,117 ounces, or 67,406 kilograms, fine, worth $44,798,284, at which figure it appears in the table of the world's production of gold and silver.

According to the table referred to above, Australasia produced, in 1895, 909,572 ounces fine of silver, and silver, lead, and ore of the value of £1,558,599, or $7,584,922. At the average price of silver during the

[1]Quantity received at Melbourne and Sydney mints.

[2]In addition silver, lead, and ore were raised, the quantities for 1895 being: Tasmania, 20,553 tons, valued at £246,636; New South Wales, 219,880 tons, valued at £1,311,963.

year, $0.654 per ounce fine, this value represents 11,597,740 ounces of pure silver, which added to the 909,572 ounces of silver bullion produced, as per above table, gives a total silver product of the Australasian colonies in 1895 of 12,507,312 ounces, or 389,102 kilograms, of the coining value of $16,171,070, at which figure it appears in the table of the world's production of gold and silver in this report.

On February 18, 1896, the Director of the Mint addressed a letter to the deputy masters of the mints at Sydney and Melbourne, requesting information respecting the fineness of the gold produced in the several Australasian colonies, with a view of determining, if possible, more accurately than heretofore the amount of fine gold produced each year in Australasia. The answers received in reply to his request are here given:

MELBOURNE, *April 16, 1896.*

SIR: In reply to your letter of February 18 last I have the honor to inclose a table showing the average assay and receipts of all gold deposited at this mint since its opening in 1872.

I regret that I can not give you the mean fineness for each colony, but the figures quoted include gold received from Victoria, Tasmania, South Australia (including Northern Territory), New Zealand, and West Australia.

I am given to understand that the deputy master of the Sydney mint is furnishing you with the figures relating to that colony and to Queensland.

I have the honor to be, sir, your obedient servant,

ROBERT BARTON,
Deputy Master.

The DIRECTOR OF THE MINT,
Washington, D. C.

TABLE SHOWING THE GROSS WEIGHT AND AVERAGE ASSAY OF GOLD RECEIVED AT THE MELBOURNE BRANCH OF THE ROYAL MINT IN EACH YEAR FROM ITS OPENING IN 1872 TO DECEMBER 31, 1895.

Year.	Gross weight received.	Average assay.	Year.	Gross weight received	Average assay.
	Ounces.			*Ounces.*	
1872	190,738	.9483	1885	836,168	.9464
1873	221,870	.9445	1886	756,248	.9482
1874	335,317	.9503	1887	769,897	.9463
1875	489,731	.9388	1888	757,548	.9447
1876	543,198	.9349	1889	761,615	.9430
1877	378,310	.9322	1890	752,547	.9457
1878	569,932	.9417	1891	805,231	.9444
1879	656,555	.9504	1892	880,052	.9409
1880	758,720	.9544	1893	946,996	.9396
1881	692,213	.9550	1894	1,061,523	.9339
1882	818,905	.9569	1895	1,092,819	.9320
1883	785,715	.9521			
1884	945,929	.9516	Average assay 1872–1895		.9390

ROYAL MINT, *Sydney, May 11, 1896.*

SIR: I have the honor to acknowledge the receipt of your letter of February 18 last asking to be supplied with information relative to the fineness of the gold produced in the several Australasian colonies.

The information you ask for not being required by us, it was not immediately obtainable, but I have caused a return to be prepared showing the fineness of the gold received for coinage from New South Wales, Queensland, and New Zealand (from which colonies our principal supplies are received), during the five years 1891–1895.

The fineness has been calculated from the gross weight before melting and the fine gold contents as determined by assay after melting, as the returns of gold produced generally give the weight of the gold in its rough state as produced at the mines, and not when brought into the form of clean merchantable bars.

The relatively high assay of the New Zealand gold is to be accounted for by the fact that a large proportion of it is refined before being sent forward to Sydney for coinage.

I append also returns giving the average assay of the gold refined here during the ten years 1886–1895, and of the weight and value of gold received.

I have the honor to be, sir, your obedient servant,

J. MACDONALD CAMERON,
Deputy Master.

The DIRECTOR OF THE MINT,
Washington, D. C., U. S. A.

FINENESS OF GOLD RECEIVED FOR COINAGE AT THE SYDNEY BRANCH OF THE ROYAL MINT DURING THE QUINQUENNIAL PERIOD 1891–1895.

[Computed from the fine gold contents as determined by assay after melting.]

Year.	Gold received from—					Average on gross weight received.
	New South Wales.	Queensland.	New Zealand.	Other places.	Coin.	
1891	.8531	.8241	.9001	.8124	.9159	.8378
1892	.8500	.8142	.9236	.8252	.9141	.8288
1893	.8494	.8150	.9299	.8466	.9078	.8337
1894	.8277	.8226	.9512	.8292	.9162	.8324
1895	.8673	.8303	.9662	.8612	.9156	.8553

AVERAGE ASSAY OF GOLD REFINED AT THE SYDNEY BRANCH OF THE ROYAY MINT DURING THE DECENNIAL PERIOD 1886–1895.

Year.	Average assay.		Year.	Average assay.	
	Gold.	Silver.		Gold.	Silver.
1886	.8377	.1432	1891	.8235	.1522
1887	.8401	.1397	1892	.8218	.1569
1888	.8297	.1512	1893	.8229	.1536
1889	.8648	.1158	1894	.8256	.1490
1890	.8513	.1284	1895	.8430	.1355

ESTIMATED PRODUCTION OF GOLD AND SILVER IN AUSTRALIA, TASMANIA, AND NEW ZEALAND, FROM THE EARLIEST RECORDS OBTAINABLE TO THE YEAR 1895, INCLUSIVE.

[From returns kindly furnished by the government of each colony.]

GOLD.

Year.	New South Wales.	New Zealand.	Queensland.	South Australia.	Tasmania.	Victoria.	Western Australia.	Total.
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*
1851-1884 inclusive	9,596,642	10,552,279	4,529,280	154,628	378,413	53,023,985	.....	78,235,227
1885	103,736	237,371	310,941	18,327	37,317	735,218	.....	1,442,910
1886	101,416	226,668	340,998	21,115	31,014	665,396	302	1,386,909
1887	110,288	203,869	425,923	37,371	41,751	617,751	4,873	1,441,826
1888	87,503	201,219	481,643	16,763	39,610	625,026	3,493	1,455,257
1889	112,948	203,211	739,103	20,833	33,050	614,839	15,493	1,739,477
1890	127,460	193,193	610,587	24,831	20,510	588,560	22,806	1,587,947
1891	153,335	251,996	561,641	28,700	48,769	576,399	30,311	1,651,151
1892	156,870	237,392	605,612	38,974	43,278	654,456	59,548	1,796,130
1893	179,288	226,811	616,940	33,820	37,687	671,126	110,891	1,876,563
1894	324,787	221,615	675,000	35,844	57,873	716,955	207,131	2,239,205
1895	360,165	293,491	623,000	*a* 47,343	59,964	740,086	231,513	2,355,562

SILVER.

Year.	New South Wales. (*b*)	New Zealand.	Queensland. (*b*)	South Australia.	Tasmania. (*a*)	Victoria. (*c*)	Western Australia.	Total. (*b*)
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*
1851-1884 inclusive	935,384	447,923	.....	.....	.....	280,991	.....	1,664,298
1885	794,173	16,624	.....	.....	.....	28,951	.....	839,748
1886	1,015,433	12,108	.....	.....	.....	26,422	.....	1,053,963
1887	177,307	20,809	.....	.....	.....	26,321	.....	224,437
1888	375,063	403	.....	.....	.....	27,331	.....	402,797
1889	416,895	24,105	.....	.....	12,000	30,281	.....	483,281
1890	496,552	32,627	.....	.....	.....	25,966	.....	555,145
1891	729,590	28,023	.....	10,000	202,797	30,039	.....	1,000,449
1892	350,661	22,053	203,680	.....	177,445	35,857	.....	789,696
1893	531,972	63,076	339,267	.....	.....	40,941	.....	975,256
1894	846,822	54,177	163,410	.....	.....	50,909	.....	1,115,318
1895	550,142	85,024	223,759	.....	.....	50,647	.....	909,572

a Quantity received at Melbourne and Sydney mints.

b In addition, silver, lead, and ore were raised, the quantities for 1895 being: Tasmania, 20,553 tons, £246,636; New South Wales, 219,880 tons, £1,311,963.

c Extracted at Melbourne mint.

The following article on the gold production of Australia and New Zealand is part of the paper by Dr. Hauchecorne on the Present State of the Production of the Precious Metals, submitted to the Berlin Silver Commission of 1894:

AUSTRALIA.

The gold production of Australia began three years after the first discovery of gold in California with the discovery of alluvial gold in February, 1851, near Bathurst, in New South Wales. In August of the same year alluvial gold was found at Ballaret and at Sandhurst, in Australia; in 1852 in South Australia and Tasmania,

then in Queensland, and later also in West Australia, so quickly did the exploitation spread to all colonies and reach an extraordinary height.

The original sources of the gold are mainly quartz veins running through the old Silurian and Devonian rock strata; in part also through the older systems, being either so-called stratum veins between the rock strata or running through the strata in the form of true fissure veins.

Another mode of occurrence is that of the so-called saddle reefs, saddle lodes, fillings of cavities between the rock strata in the saddle or trough-shaped flexures of the sharply folded old slate formations, which are widely distributed and important, especially in the deep mines of the Victoria colony. In old crystalline rocks, too; in granite, syenite, old porphyries, porphyrites, diorites, felsites, and serpentines connected with these ancient stratified rocks gold-bearing quartz lodes and networks of veins with zones of disseminated ore occur, in many cases in the rocks themselves.

By the breaking up of the original deposits the gold was scattered, an event which took place as far back as the time of the formation of the next younger strata of the Carboniferous, in whose conglomerates and sandstones it has been found, without, however, proving remunerative. The drift deposits, however, attained immense importance in Tertiary time, in which, as in California, they were covered by basaltic flows and were repeated (deep placers), as well as subsequently, in the periods of the younger valley formation down to the present, in which those deep placers were in part worked over and redeposited, and the more superficial and outcropping gravels of the shallow placers were formed, which were the objects of the first wholesale gold diggings.

The exploitation of the gold-gravel deposits of Australia has developed with enormous rapidity. Whereas in 1851 there were obtained altogether about 11,000 kilograms (353,650 ounces) of gold, in 1853 the production attained its greatest figure, 102,560 kilograms (3,297,304 ounces), whereupon it fell again, reaching its minimum, 43,200 kilograms (1,388,880 ounces), in 1886. Since then the output has increased, being 49,654 kilograms (1,596,376 ounces) in 1892. The production in 1893 will be even greater.

Since the middle of the fifties the conditions of exploitation in Australia have steadily changed in a manner which justifies the expectation that the output will for a long time be maintained at the same figure, and even higher.

As far back as 1854 the exploitation by subterranean mines of the auriferous quartz veins exposed by the removal of the gravel deposits was begun and soon attained great extension and importance, till at present it is the prevailing method.

In the colony of Queensland the most important gold fields now in the course of exploitation are Charter Towers (which at present yields the largest output of all the gold fields of Australia), Rockhampton, Crodon, Gympie, Etheridge, Ravenswood, Palmer, and Eidsvold. Almost the whole product comes from quartz-vein mining. In the entire area there was obtained—

Year.	Alluvial gold.	Quartz gold.	Total.
	Ounces.	*Ounces.*	*Ounces.*
1877	164,778	188,488	353,266
1880	86,082	181,054	267,136
1885	21,936	289,005	310,941
1890	19,069	591,518	610,587
1891	16,021	560,418	576,439

In Victoria, where the gold fields of Ballaret, Sandhurst (Bendigo), Beechworth, Maryboro, Castelmaine, Gippsland, and Ararat are worked, the gravels at present furnish 33 per cent and the gold-quartz mines 67 per cent of the production.

The total production was:

Year.	Ounces.	Year.	Ounces.
1877	809,653	1890	588,560
1880	829,121	1891	576,399
1885	735,218		

In the famous old field of Sandhurst, which is the one having the deepest mines in all Australia, ten of them exceeding 2,000 feet, there was a much larger production in 1892 than in 1891. While in 1891 145,556 ounces were obtained, the production in 1892 was in the first thirty-seven weeks 134,203 ounces, to which corresponds a total for the whole year of about 188,600 ounces. Of this total output about 96½ per cent was obtained by subterranean mining.

Although the technical methods, both in the working of the gravel deposits and in the furnace operations on the gravelly gold ores, in this colony is not up to the times, still the product there in recent times has steadily increased.

The total production of the colony was:

Year.	Ounces.	Year.	Ounces.
1877	121,110	1889	119,750
1880	118,600	1890	127,769
1885	101,736	1891	153,396
1888	87,503		

The colonies of South Australia, West Australia, and Tasmania have not thus far yielded any notable production, but contain gold fields that promise much. In recent times exceedingly rich finds of gold are said to have been made in West Australia, in the districts of Dundas and Coolgardie, about 560 kilometers (347.9 miles) from Perth. No authentic information concerning them has, however, been received. We give below the gold production of these colonies for the same period as above, adding Tasmania and New Zealand, although the latter will be considered separately elsewhere:

Year.	New Zealand.	Tasmania.	South Australia.	West Australia.
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*
1877	371,685	5,777	11,811	.....
1880	305,248	52,595	13,245	.....
1885	237,371	37,317	18,327	.....
1888	201,219	39,610	16,763	3,493
1889	203,211	33,050	20,000	15,493
1890	193,193	23,451	22,256	22,356
1891	251,996	48,769	20,700	30,811

In considering the future prospects of the Australian gold production the experiences concerning the results of mining in the gold-bearing quartz veins are of decided importance. As already mentioned, this production in the most important gold fields of the colonies of Queensland, Victoria, and New South Wales outweighs that of the gold washings, which are in their decline.

In view of the enormous number of localities, amounting to thousands (in Victoria *alone* over 3,000 are said to be known) and constantly increasing, we may

reasonably look for a considerable extension of the vein-mining industry, and consequently an increased production, for a long time to come.

The results of the subterranean gold mines have, indeed, shown that among the lodes in course of exploitation there are many whose gold contents, in view of the present state of technical appliances and the expenses in working the ore, do not pay. On the other hand, there have been found and there are still disclosed from time to time veins which by their wealth in gold will afford a surplus for a long time to come and insure a certain steadiness in the total production.

As to the behavior of the veins in reference to the maintenance of their richness in gold lower down, a definite answer can only be obtained by an accurate comparative study of the results of all the various mines. From the examination of reliable specialists closely familiar with the conditions it would seem certain that many lodes grow poorer downward. On the other hand, however, there are numerous cases in which the lodes as they went deeper showed a uniform, sometimes even an increasing, richness. In this respect special interest attaches to the statements contained in the annual report of the secretary for mines for 1891. In the following table there are given for the colony of Victoria the amounts for quartz material worked upon in tons, the gold thence obtained in ounces, and the resulting average yield in gold of a ton of crude ore for the decade 1882–1891. The table does not show the total ore worked up, but only the amounts of those mines from which data could be obtained:

Year.	Stamped quarts.	Yield in gold.	Average yield per ton.		
	Tons.	*Ounces.*	*Oz.*	*Dwt.*	*Gr.*
1882	1,027,826	463,463	0	9	0
1883	924,430	440,686	0	9	12
1884	876,692	432,996	0	9	21
1885	843,250	423,996	0	10	1
1886	831,375	391,988	0	9	10
1887	780,733	367,519	0	9	9
1888	734,313	357,928	0	9	17
1889	732,461	358,893	0	9	19
1890	752,398	346,158	0	9	4
1891	772,964	355,715	0	9	4

From this it appears that on the whole the average gold content of the ore shows a remarkable uniformity, although in this decade the work advanced rapidly downward. The average content of 9 to 10 pennyweights per ton paid quite well.

It is very interesting also to note how during the past thirty-two years—1860–1891—the product of the miners engaged in gold mining showed up in one year. It was:

In the ten years 1860–1869, on an average	$385.48
In the eleven years 1870–1880, on an average	432.90
In the eleven years 1881–1891, on an average	485.97

It thus shows a very considerable rise, whence it may be inferred that the economic conditions of the mines are favorable and the technical appliances have been perfected.

Special information concerning a group of those pits of the gold field of Sandhurst (formerly called Bendigo) in which the work has been carried to the greatest depth are contained in a monograph by Rickard in volume 20 of the Transactions of the American Institute of Mining Engineers (New York, 1892, p. 538, et seq.), which affords an insight into the economic results of deep mining. It is taken from the quarterly reports of the Victorian mining department. First, it is stated that it was pit No.

180 on Victoria Hill on the lode of the New Chum that took the lead in going to great depths. In 1873, when it had a depth of 400 feet, it passed into the hands of new proprietors, who undertook the downward advance with great energy, and at a depth of 600 feet obtained £120,000 worth in gold. Then the work was carried on for ten years without success, until in 1883, at a depth of 1,548 feet, an exceedingly rich body of gold ore was struck. In 1890 the pit reached a depth of 2,641 feet.

The example thus set was followed by a great number of other pits, so that at present 18 shafts over 2,000 feet deep are in operation. In these, too, rich bodies of ore were disclosed at great depths: In Extended Hustlers at 1,800 feet, in New Chum Consolidated at 1,810, in Shenandoah at 1,900, in Lazarus at 2,000, in "Lansell's 222" at 2,000, in New Chum Railway at 2,025, and in North Old Chum at 2,290.

The results of the operations of twelve of these mines in 1890 are given in the following table. From this it appears that the 12 pits, with an average depth of 1,945 feet and 85,310 tons of ore, yielded 42,571 ounces of gold, which corresponds to an average of 10 pennyweights per ton:

Name of mine.	Ore worked up.	Yield in gold.	Average yield in gold per ton.	Depth to which work is carried.	Depth of shafts.
	Tons.	*Oz. dwt. grs.*	*Oz. dwt. grs.*	*Feet.*	*Feet.*
Great Extended Hustlers	16,612	3,780 4 0	0 4 13	1,800	2,040
Lazarus Company	6,232	5,059 0 0	0 16 6	2,000	2,110
Lazarus No. 1	7,282	3,665 16 0	0 10 1	2,000	2,110
Lansell's 222	3,454	2,510 2 0	0 14 12	1,950	2,105
New Chum Consolidated	18,721	5,153 14 0	0 5 12	1,800	1,850
New Chum United	9,797	2,243 10 0	0 4 14	1,900	1,940
New Chum Railway	7,325	10,371 17 12	1 8 8	2,025	2,078
Shenandoah	7,474	5,039 3 0	0 13 11	1,990	2,010
North Shenandoah	1,048	948 3 0	0 18 2	1,990	2,010
Shamrock	2,496	1,446 19 21	0 11 5	1,800	1,840
North Old Chum	1,752	1,169 13 0	0 13 8	2,290	2,310
Kentish	3,117	1,183 13 0	0 7 14	1,800	2,113
Total	85,810	42,571 15 9	.....	23,345	24,518
Average	.....	.....	0 9 23	1,945	2,063

Of these twelve mines eleven pay dividends. New Chum Railway, which at 2,025 feet struck an ore of almost 1½ ounces per ton, paid £21,672 on a capital of £28,600; Shenandoah paid £8,400 on £12,800 capital; Lazarus, £15,750 on £63,000 capital But even mines with very low gold contents still yielded good results. The New Chum Consolidated yielded ore which on an average did not always contain 5 pennyweight 12 grains, but over a longer period only 3 pennyweight 14 grains per ton. The money returns per ton of ore were 16s. 9d., the cost of production being only 13s. 5d. per ton. An annual dividend of 11 per cent was obtained.

On a general average the cost of production of an ounce of gold in 1890 for the mining industry of the gold field of Sandhurst is said to have been £2 10s. 8d., which, with a value of £4, yields to the owner a surplus of £1 9s. 4d. per ounce.

The silver production of Australia ten years ago was quite inconsiderable. Its rise begins with the discovery of the silver and lead ore lodes of Broken Hill in New South Wales, in the mountain range extending in a north-south direction, northeast of Adelaide, and called Barrier or Stanley Range. The principal deposit is a vast lode of ore in crystalline slates, which have been broken through by eruptive rocks.

The discovery of that lode, which in its upper parts contains rich silver ore (chloride and bromide of silver, etc.), besides lead carbonate ores rich in silver, was made in 1883, and thereupon, after the first explorations, there began a development, dating from 1885, which in rapidity and extent recalls the early days of the greatest

deposits of precious metals in North America, the Comstock Lode, the Eureka mine, etc. The mining operations have penetrated to a depth of 700 feet. The easily fusible ores of the outcrop are replaced farther down by an intimate mixture of lead glance, zinc blende, copper pyrite, and other sulphides which are difficult to treat by metallurgic methods.

The total output of the Larrier Range mines in 1892 was 415,000 kilograms (13,342,250 ounces) of silver, of which the Broken Hill property alone furnished 257,500 kilograms (8,278,625 ounces).

The following table shows the development of this industry in the nine years since its beginning:

SILVER PRODUCTION OF THE BROKEN HILL PROPERTY MINING COMPANY.

Year.	Ore worked up.	Lead obtained.	Silver obtained.	Silver.	
				Per ton of ore.	Per ton of lead.
	Tons.	*Tons.*	*Ounces.*	*Ounces.*	*Ounces.*
1885	48	.....	35,605	742	.....
1886	11,500	1,991	1,016,269	88	510
1887	47,211	9,348	2,103,225	44	225
1888	94,125	16,650	3,924,192	41	235
1889	157,184	25,076	6,003,299	36	239
1890	207,311	30,339	7,727,877	36	254
1891	286,118	41,688	9,947,038	34	238
1892	254,825	36,497	8,065,148	31	221
1893	490,510	47,344	12,505,426	25	263
Total	1,548,832	208,942	51,328,079	33	245

Aside from the years 1885–86, in which the richest silver ores of the outcrop were exploited, the silver content of the lead appears to be pretty uniform.

Besides the mines of the districts of Broken Hill, Silverton, and Sunny Corner, on the Barrier Range, important finds are said to have been made recently in west and north Australia, concerning which, however, nothing certain is yet known.

NEW ZEALAND.

English and American statistics usually treat of New Zealand as forming, with the continent of Australia, a unit, to which Tasmania is added. New Zealand, however, possesses an importance which justifies special treatment.

The natural basis of the gold industry of New Zealand is similar to that of the eastern parts of Australia. Through both islands (Middle Island in the south, North Island or Auckland in the north) there runs a mountain core of crystalline and Paleozoic rock strata, surrounded by a younger strata of the Triassic, Jurassic, Cretaceous, and Tertiary formations. In the core auriferous quartz veins rise. The destruction of these has led to the formation of auriferous gravels, principally on the west side of the Southern Island, but also on its southeast side. These gravel strata fill the gorges of valleys running high up into the mountains—terrace drift—and attain a thickness of 300 feet or more. Lower lying terraces (flats), with occasionally very abundant gold contents, occupy the space between the foot of the mountains and the coast.

Finally, gold-bearing sand which repays exploitation is found in the bays of the sea at the mouths of rivers on the west coast.

The first discovery of gold (which happened to be gold quartz) occurred in the Auckland district soon after the discovery in Australia, but only in 1862 that district was declared to be a gold field. In 1857 the first paying gold field, that of Collingwood, in the Nelson district, at the north end of Middle Island, was opened. Next,

in 1861, in the southern part of Middle Island, in the Otago district, the rich gold fields of the Clutha River area west of Dunedin were discovered, which yielded 187,700 ounces of gold the very first year. Finally, in 1864, there followed the discovery of the rich alluvial gold fields of Kumara, Ross, and, later on, Waiho, on the west coast of Middle Island.

In Auckland the gold was obtained from the very first by lode mining, whereby rich deposits of gold-bearing quartz were disclosed on the Hauraki peninsula at Tiki, among others, and especially in the region of Thames River, which flows into Hauraki Gulf from the south. At Waihi, Karangahake, the Aroha, in the Reefton district, rich lodes were exploited, on which the work was sometimes carried down with good results to a depth of about 200 meters (656.16 feet). In Middle Island the exploitation was at first exclusively confined to the drift deposits, which furnished a very rich yield, especially in the region of Otago. Gradually, in the mountain districts, after the removal of the younger alluvium, the transition was made to the vast deep placers, the so-called terrace drift, which in some places are exploited by hydraulic methods, as in California.

Recently gold quartz veins have also been found, and work has been begun in the Collingwood gold field. These veins rest on Silurian slates.

Similar discoveries have been made in the valleys of the rivers Mokihinui and Waimangaroa and in the valley of Cascade Creek at Westport.

According to the information at hand not only are the prospects of the existing gold-mining industry quite favorable, but the discovery of further subterranean deposits may with probability be foreseen.

The extraction of gold from the placers, too, has still before it a sufficient working field in the extensive and heavy deposits.

New Zealand, therefore, will probably continue for a long time to contribute its very considerable quota of gold.

In the accompanying table (3) the gold production of New Zealand is given for all the years from 1857 to 1892. The years 1862 to 1873 were those in which the masses of alluvial gold, which are easiest of extraction, were obtained.

The discovery of these alluvial deposits occurred at a time when the rush of gold seekers into Australia was diminishing, the easiest golden harvest there having been garnered in the preceding decade. The gold diggers thereupon rushed toward the new gold fields of New Zealand, to abandon these also ten years later, when the exploitation began to grow more difficult. At present it seems to be simply the difficulty in obtaining labor which retards the increase in the production of New Zealand, despite the discovery of the new sites.

For the various areas the total gold output thus far was as follows:

	Ounces.
Auckland	1,737,525
Wellington	188
Marlborough	76,856
Nelson	242,803
West coast	5,333,135
Canterbury	48
Otago	4,969,687
Total	12,360,242

No exploitation of silver ores has thus far been undertaken in New Zealand. In recent times, however, silver-ore lodes have been found in the Collingwood field and elsewhere, which are being investigated.

The amounts of silver shown in the statistical statements from New Zealand were without exception obtained by the parting of silver-bearing gold.

PARTICULARS OF THE PRODUCTION OF QUEENSLAND IN 1895.[1]

The quantity of gold produced during the year, as collated from the warden's reports, has been 631,682 ounces, which brings the value of all gold yielded by Queensland mines, so far back as there is a record, to £36,955,117 10s.

The custom-house returns and those of the officers of the department show such an unaccountable disparity that I must refer to them here. The customs return of gold exported is 692,167 ounces. Deducting 1,979 ounces shown as foreign gold, and also 19,323 ounces, being the reduction made by me in the case of 33,519 ounces of bullion, admitted wrongfully in the Croydon report as gold, while its gold contents were only equal to 14,196 ounces of the ordinary run of gold in that locality, still 39,183 ounces are left unaccounted for. That this quantity of gold is the product of the colony I have no doubt whatever in my mind, but I have no means to assign it to its proper source. Discrepancies between the exports and the returns from the gold fields are inevitable, as gold shipped at the beginning of the year frequently represents the product of the previous one, but as hitherto this difference has not exceeded the limit of 4,000 or 5,000 ounces, I am constrained to confess that I can not hope to suggest any satisfactory explanation for this extraordinary fact.

Taking the warden's returns, there has been a decline, when compared with the previous year, of 47,829 ounces. The only increases can be credited to Mount Morgan, Clermont, and a couple of the smaller fields. On all others, if I except Gympie, and perhaps to a very small extent Charters Towers, the deficiency must be attributed to the exceptionally dry season that stopped all crushing operations for many months, leaving not only large accumulations of unreduced ore at grass, but also causing many of the smaller mine owners who can not afford to wait very long for the fruit of their labor, to discontinue raising stone, at least for a time, if not betaking themselves to somewhere else. Hence the number of quartz miners shows a decline at the end of the year of 540, a good many of whom, I suspect, having yielded to the distant charm of West Australia.

Quite contrary to what might have been expected from the effects of such an unfavorable season, there has been an increase in the yield of alluvial gold of 2,854 ounces, clearly due to the miners at Clermont. The number of white alluvial miners, however, has been reduced by 444, consisting principally, I am inclined to think, of the amateur miners that were recruited during the year of depression from the ranks of the unemployed. The Chinese miners have been reinforced to the extent of 192. There are no visible facts that would justify the anticipation of an increased yield of alluvial gold in the future, and if that of the last couple of years can be maintained it will be quite as much as can be expected. I am looking, however, confidently forward to a very substantial increase in the yields from lode mining, an anticipation that the prospects obtained from opening the deep ground seems to fully justify.

* * * * * * *

The life of our most productive gold mines so far has certainly not exceeded twenty-five years, but of course there may be some that will not be worked out during such a short period.

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In reviewing the results obtained during the year of the several gold fields of the colony, it may be said of that of Charters Towers that it has not forfeited its just claims to premier position, nevertheless that the yield of gold has not been quite equal to that of its predecessor. Steady and healthy progress must be recorded in every direction, and the implicit confidence in its immense wealth has not been on the wane by any means. There probably has been no similar period in the past when so much work of a purely progressive nature has been effected, thereby providing a basis for the increased prosperity of the future.

The number of gold mining leases now numbers 126, with a total area of 2,344 acres.

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[1]From the Report *of the Department* of Mines, Queensland, for the year 1895.

Besides this, about 50 ordinary and extended claims are being worked. Improved methods of mining, such as only can insure success in operating on the lower grades of ore, which in the former primitive conditions could not possibly be made payable, are steadily becoming the rule instead of being the exception. As one of the important facts in this direction, it may be mentioned that the number of rock drills has risen now to 87, and that the additions to the appliances that make economical mining possible have been numerous.

Prospecting in the deep ground has been carried on most extensively and at great expense. Thus the Day Dawn Freehold Extended put in 900 feet of drives from their 1,200 feet level at a cost of about £25,000, striking payable stone in their eastern level, but as the reef was found to underlay towards the shaft, further sinking in the meanwhile has been determined on to facilitate more economical winning of the ore in the future. Opening out ahead has also been the order of the day once more in Mill's Day Dawn United since the foot-wall reef was found to pinch out and pay ore running short. During the year 1,200 feet of drives were added to these extensive workings. The Brilliant Extended Block Mine, in which the reef is calculated to be struck at about 2,250 feet, has added another 835 feet to its depth.

Another extensive and costly undertaking has been the cutting down of the New Brilliant Extended shaft so as to make its upper portion of uniform dimensions with the lower and more recent ones. This very necessary alteration and the addition of one of the most improved and powerful winding plants on the field should place this mine in a position to contribute large quantities of stone from what are at present the deepest workings in the colony.

The total output for the year has been 249,520 tons, yielding 251,577 ounces of gold. This includes the gold recovered by the chlorination and cyanide works from concentrates, slimes, sludges, etc., amounting to 13,683 ounces.

Among the leading contributing mines stands first Mill's Day Dawn United, with 35,389 tons and 37,732 ounces, permitting the payment of dividends amounting to £45,000. The Brilliant follows closely with 33,772 tons, yielding 35,059 ounces, but paying £55,250 in dividends. The Brilliant Block also was to the fore with 30,910 tons, producing 26,684 ounces and furnishing dividends amounting to £27,500. This mine is at present erecting a 40-head battery for its own sole use, and is connecting it by rail with the mine and also with the Government line to provide for the carriage of fuel.

The list of dividend-paying mines was headed by the Brilliant and St. George United, which could distribute £57,600 among its shareholders from 29,890 ounces extracted from 17,501 tons of stone, and may at present be considered the most prosperous mine on the gold field. The Day Dawn Block and Wyndham also once more has put in an appearance among the list of large producers with 15,810 ounces from 19,994 tons, and gives promise of even a larger output in the future.

Among the unexpected developments that have taken place during the year, the discovery of the Golden Surprise reef deserves especial mention. The new find was made in a locality that has received little or no attention from the miners for years, and as the reef showed no outcrop, the fact of its being overlooked so long is not surprising. The fact that a crushing from shallow ground gave 676 ounces from 218 tons justifies the expectation of a bright future, and has led to the taking up of a considerable area of ground in the vicinity, with the result that stone showing gold has been discovered in several instances.

The Hope and Identity lines of reef have been taken in hand again by a strong company, and have been equipped now with very powerful pumping machinery that will lift the water 1,000 feet if required, and if the excessive influx of water that has in the past proved the great obstacle to successful mining there can be kept in check, a revival of mining about Milchester may be looked forward to with certainty. Here also the old Lady Antrim, now under the new title of Lady Florence, has been resuscitated once more, and is being worked now at a depth of 300 *feet.*

There are several other lines of reef here that no doubt will pay in the future, when the "windlass and wheelbarrow age of mining" will have been passed once and forever. Another line of reef that is receiving attention of late is the Columbia. The difficulty here in days gone by has been the refractory nature of the ore, but now it would appear that recent tests have shown that the ore can be made amenable to the treatment by cyanide, and if this is so, and if at the same time mining is conducted on the more advanced lines that are coming at last in vogue, in place of what not inaptly might be termed the "pig-rooting method" that has been mistaken for mining for so many years in Australia, success there is not at all unlikely.

As an important mining event may be mentioned the striking of a 3-foot reef of 3-ounce stone in the Queen Cross reef at over 1,000 feet. In the New Queen the meeting with the Brilliant reef is looked forward to, and if this expectation should be realized this fact should prove of much importance to the other mines in this locality as well.

The diamond drill loaned by this department to the Golden Gate Company, and subsidized towards its working expenses from the Deep-Sinking Vote, has reached as far as 2,800 feet without penetrating any reef, but the bore will be continued now to the depth of 3,000 feet. The boring throughout has been through solid granite, and the nonsuccess would prove a sore disappointment in the case of a very plucky enterprise.

A lot of work, more or less of a prospecting nature, has been going on about the Imperial and Old Warrior lines of reef, where a number of leases have been taken up, but without having added, so far, very much to the general output.

Mount Leyshon has produced 5,442 ounces of gold from 37,367 tons of stone put through the stampers, equal to 1 pennyweight 15 grains per ton, and as this feat has been performed with the result of leaving a small margin of profit, I think the fact may be safely quoted as the record of the most economical gold extraction in Australia.

The decline in the total output for the year was doubtless due to the fact that during its second half the fortnightly output from Mill's Day Dawn United mine dropped from 2,000 tons to 700, owing to the pinching of the reef they were working on, a fact which also necessitated a large shortening in the number of miners employed. It may be presumed that the immense output of stone that was in sight had the effect of inducing neglect in opening out ahead, but this omission has been amply remedied now, and as the discovery of a new reef under foot will allow of opening new faces, the big mine will doubtlessly resume its former position.

There is a small decrease in the number of miners, about 50. Many men have left for Western Australia under the impression that they have bettered their position in doing so, but their loss has caused no inconvenience, although in their number must be included some of the best men on the field. Temporarily, their departure made itself felt in so far that the forcing into the market of their mining interests had the effect of lowering values for a time. Notwithstanding all this, the exchange value of all mining shares on the gold field at the end of the year stood at £2,185,000, which shows an increase of £30,000 when compared with the preceding year. On the other hand, there was a decrease of nearly £55,000 in dividends, for which the falling off in the mine previously referred to will amply account, not to mention the reserves that have very prudently been made by some of the companies to provide against unexpected contingencies.

The increase of about £40,000 in calls is probably a fact more or less unpalatable to the shareholders, but nevertheless a healthy symptom in this instance, being the inevitable consequence of developing the resources of the mines and adding additional plant that must secure more advantageous working in the future, and must assure the future of a progressive gold field, such as Charters Towers.

Very little work has been done in the outlying small mining centers, such as Homestead, Black Knob, Mount Windsor, etc. At the Cape River a fair living was

made at the beginning of the year by about a couple of hundred men, but their number has been reduced now from necessity. Taken altogether, the output from the lead is estimated at 4,500 ounces. A part was subsidized by the Department to prospect for any possible extension of the lead under the conglomerate, but they have failed to break the record in the result of expenditures of a similar nature, unless that the existence of a few small colors of gold under the overlying formation can be accepted as a valuable discovery. There has been very little reefing here, but a consignment of 12 tons of quartz to Charters Towers from Specimen Gully gave the handsome return of 189 ounces of gold. The erection of a small battery is contemplated once more at Pentland, but unless stone can be raised in much larger quantities than has been the case in the past it is hard to see the inducement to the mill owner to equip his plant with all the costly gold-saving appliances that nowadays are considered a *sine qua non*, and it seems more than doubtful if the advantages that a complete modern mill must offer in returns would not more than cover the railway freight to Charters Towers.

The Crocodile Gold Field, which, as far as lode mining is concerned, consists of the Mount Morgan and 15 other leaseholds, and which hitherto has been administered in connection with the Rockhampton Fields, was placed during the year in charge of a warden of its own. The statistics, taken as a whole, have been of a very satisfactory nature, showing a total output of 88,578 tons of ore for 133,137 ounces of gold, showing increases over 1894 of 12,332 tons and 19,031 ounces. The credit of this splendid result belongs to the Big Mine, which has been worked with a great deal of activity and judgment, and a further increased output of stone is evidently contemplated, as a fourth set of reduction works is in course of construction. The company gives employment to 1,100 men, which includes 260 miners. The calamity that was impending toward the end of the year, to have to stop operations for a time for want of water, was only averted by the intelligent energy of the management in collecting together all obtainable water by pumping from old shafts and the few water holes left in the water courses. The developments in the other mines have been but inconsiderable, as with the exception of Mount Usher and the "Struck Oil P. C." the quantity of stone raised has in no case exceeded 30 tons or the yield of gold reached 40 ounces. The want of water for mill use is, however, accountable to some extent for this unsatisfactory fact. The mines besides Mount Morgan have provided employment for about 150 men. Alluvial mining has also been anything but a success, and as far as can be ascertained the earnings of the 25 Europeans engaged in this occupation have averaged only about 12s. per week per man. Still, it is quite probable that they may have fared somewhat better than this, as it is next to impossible to obtain anything like reliable information of their doings. The belief in the future of the gold fields is one of the pleasing features in the facts connected with it, as is testified by the rapidly increasing settlement and the erection of substantial buildings in the township and its environs. The auriferous cements and conglomerates at Mount Victoria should receive a practical test during the new year, and if the expectations entertained at present should be realized, a good addition to the general output of gold from this source may be looked forward to.

The output from the little mining centres that constitute the Rockhampton division shows a diminution of close upon a couple of thousand ounces. Only 1,416 tons of stone were put through for 1,431 ounces of gold, principally the product of Ulam and Cawarral. The yield from alluvial workings also fell short by nearly 200 ounces. Under this heading Ulam and Stanwell led the way. In the former place some remarkably good patches were obtained, with a 16-ounce nugget among them. There is some probability that Cawarral will receive more attention again shortly, and certainly considerably more stone has been raised there of late than for some time previously. Rosewood furnished employment for a number of men engaged in surfacing, while Ridgelands, to all intents and purposes, may be considered abandoned. Morinish has not progressed, the intractable nature of the otherwise rich *stone evidently* retarding more extensive operations.

The existence of some alluvial gold near Rockwood, on the Mackensie River, was reported, but the dry weather has stood in the way of submitting this ground to anything like a test so far. There has been a good deal of prospecting all over the district, and 32 prospecting protection areas have been in force.

The gold field on which the most serious decline in output has taken place is Gympie. The drop has been from 111,569 ounces to 78,026 ounces, equal to quite 30 per cent, a result quite as unexpected as unpalatable, for the new year had opened under the most favorable auspices and under such conditions as apparently justified anticipations of a continuation of heavy yields. In analyzing, however, the results of the year's operations the fact that the preceding year had been a phenomenally successful one and the one that, with the exception of 1889, has been the record one in productiveness, must not be lost sight of, and it also should be borne in mind that after all the gold raised was quite equal to the last quinquennial average.

That there has been overspeculation engendered by success can not be denied, and can be seen at a glance at the fact that 53 new leases were applied for, out of which it was considered at the end of the year that 27 only were worth holding.

But in the face of the unfulfilled expectations and blighted hopes the year has been an extremely busy one in the mining sense of the word, and numerous plucky new ventures of a more or less formidable nature have been initiated with a view of developing the resources of the field. To provide the required capital for those operations, calls had to be made equaling within a few thousand pounds the total of dividends declared during the year, and actually exceeding in amount those made during the phenomenally prosperous 1894 by £2,240. Unfortunately it can not be said in truth that the money got out of the ground has simply been put back, as the dividends go to the few, whilst the calls fall to the share of the many. Hence the unabated enterprise thus displayed may be clearly accepted to demonstrate the unaltered confidence in the future of this important gold field by those who from their long connection with it should be the most competent judges of its intrinsic merits, and that such is the case may be seen at a glance at the firmness with which shares are being held, for the value of the mines, computed at the selling values of the shares at exchange quotations at the end of the year, has fallen only about £10,000 below those of the previous exceptionally prosperous year.

The margins between dividends paid and calls made amounted to only about £7,000, an unpleasant fact after the previous year, when the proceeds of more than half the gold raised could be set aside as pure profit. But notwithstanding such altered conditions the means were cheerfully forthcoming to make it possible to engage in such a large amount of energetic dead work of a prospecting nature as has been done in the shape of sinking and driving, which should form a solid basis for much remunerative work in the near future.

It is to be hoped, and there are good reasons to believe, that the eastern portions of the field, on which the duration of its future life naturally to a great extent must depend, and the development of which unfortunately has been imprudently delayed so long, will hereafter meet with a more thorough and systematic exploration than that fallen to its lot hitherto, and which certainly should have received considerably more attention in the past.

The spirited enterprise of the sinking of a deep shaft—which may not fall far short of a depth of 1,500 feet before the Smithfield reef can be struck—in the Australasian mine by an English company in the northern portion of this eastern auriferous belt, and the driving at the 900-feet level in the No. 1 N. Great Eastern mine at its more southern limit, must be viewed as very legitimate explorations, and those operations will no doubt furnish very valuable data on which to base future operations on this portion of the gold field.

The new discoveries during the year have been few and far between. The most sensational one no doubt was the meeting with the exceedingly rich patch of stone in "Jones' Caledonia," which was discovered in October, when 23 tons of stone yielded at the rate of nearly 70 ounces of gold per ton. Another noteworthy

discovery was the find of a reef of good payable stone in the Columbia Smithfield, at the 725-feet level, which probably will affect favorably other mines in this locality.

The principal gold producer has been the Phœnix mine, which has contributed to the general output over 2,000 ounces per month. The No. 1 N. Glanmire and the No. 1 N. Phœnix come next in productiveness during the period under review. I think it is reasonable to anticipate that a number of mines that have been more or less unproductive up to the present may come to the fore during the year just commenced, and among these the North Smithfield should almost to a certainty be found again among the dividend payers. However, it may be mentioned that during the year this mine has paid expenses. Those constituting the northern extremity of the Phœnix line of reef, and some others in that vicinity, should show favorable developments, while others, such as the No. 1 North Smithfield, the Oriental, and Glanmire, and the No. 7 and 8 Monkland, may not unreasonably be looked forward to helping to swell the output. In the last mentioned of the above mines it is proposed to test the reef at the 1,000-feet level by means of driving from the Great Monkland shaft, which is so far the deepest on the field, being more than 1,500 feet.

The northern portion of the gold field, which is best known as the "Two-Mile," has been allowed practically to lie idle during the year, though I think the time will come when it will be put to better use. Speculation has persistently kept aloof from this portion of the field of late, and no work that could possibly lead to success has been attempted. If the exploration in the eastern ground of Gympie proper should turn out favorably, an incentive would be created at once to give the Two-Mile another systematic trial. Its development is clearly beyond the resources of the fossicker or the men who have to depend on prompt returns for their labor and outlay of money.

What has been a novel enterprise in this colony—that is, the recovery of the gold deposits in the waterways—has so far in its results been unremunerative and disappointing. The operations of the hydraulic company in Gympie, to whom belongs the credit of having initiated river dredging here as a mode of winning gold, has provided an excellent plant for its purposes, and which has had added to it such new appliances and improvements as suggested themselves during the progress of the work, had naturally to be at the beginning more or less of a tentative nature. When it is considered that the river bed had to be first and foremost explored and freed from its timber and bowlder deposits the return of only 117 ounces of gold for six months' operations is not so disheartening as it might appear at a first glance. The company is still pushing on with its work and is hopeful of ultimate success. The first barge put on the river was 60 feet by 20 feet, and carries a 15-inch suction pump. The tearing up of the wash and the loosening of snags and other timber deposits and the preparation of the deposits for the pump is performed by a powerful scarifier, armed with eight pairs of tines or picks. The wash is delivered into a sluice 45 feet long, elevated 8 feet above the deck of the barge, provided with all the usual gold-saving appliances in shape of coir matting, ripples, etc., the heavy material being returned to the river over the stern of the barge. A second plant of rather larger dimensions has been placed on what is now known as the Deep Creek dredging area, but in this instance specially designed tables to save quicksilver and pyrites have been added to the other appliances, and when both these dredges get once into proper work the true value of the gold contents of the Mary River and Deep Creek, into which so many mills have discharged their sludge for so many years now, and which must have received a share of the gold fed into it by the gullies that intersected the alluvial deposits that have proved so rich in the early days of Gympie, should be conclusively proved.

The total yield from Gympie has been 77,988 ounces from 80,766 tons of stone, to which must be added 38 ounces of alluvial gold. This gives a decline of 32,000 odd ounces over 1894. The number of miners is estimated at 1,550, 20 of whom were *engaged in alluvial* ground.

Kilkivan can be only credited with 137 ounces of gold, the earnings of about 30 fossickers. Systematic quartz mining has remained dormant, excepting the new lease that has been taken up for the old Rise and Shine ground, where a company recently formed is sinking a shaft with a view of striking the reef below the old levels.

One hundred and sixty ounces of gold was also obtained from the "Surprise P. C." at Running Creek. It would appear that there is some payable ground in this locality, but all the land being alienated not much development can be expected unless favorable terms can be arranged with the owners of the land.

At Glastonbury only one lease and three claims have survived, and the total gold yield from there has been only 387 ounces, which includes 5 ounces from alluvial.

The old Yabba gold field is left entirely to fossickers, whose doings are quite kept to themselves, and whose output can therefore only be guessed at. Forty ounces from there was purchased by the Gympie banks, but by far the largest proportion of the gold obtained finds its way to Brisbane buyers.

Mining has also been started again at Black Snake, where 8 men were employed at the Shamrock and 6 on one of the freeholds.

On Croydon 40,026 tons of quartz were put through the stampers for 55,546 ounces of gold, showing a deficit of 7,765 tons and 16,590 ounces respectively, when compared with the previous year. The reason for this is not far to seek. It is simply the effect of a most irregular season on a locality where no provision whatever appears to be made for such a contingency. Two-thirds of the whole rainfall for the year fell in the months of January and February. After this an unbroken drought set in, which continued almost to December, when about 10 inches more could be recorded. As was inevitable, about the middle of the year mill after mill had to be hung up for want of water, and many promising shows had to be thrown up by working miners who are compelled to consider the prospects of handling the fruits of their labors as they go along. But even as it is, the unreduced stone lying at grass at the end of the year carried enough gold to have brought the yield of the year up to its predecessor, and therefore the unsatisfactory result must not be ascribed to a decline in the resources of the district. For although the progress made has not been so distinctly marked as it would have been under more favorable auspices, there certainly has been no retrogression. I fear the same story will have to be told year after year in connection with this gold field, until the proprietors of batteries will realize the fact that if they have desire to see themselves and their district prosper they must conserve water in a proper and workmanlike way. This certainly is not achieved by tinkering up shallow natural water holes with a bit of clay puddling and other similar makeshifts which might suggest themselves to a man of resources at a pinch. They might have realized long ago that they carry on operations in a region where the precipitation of rain is most capricious and irregular, and as a rule—for an even season is certainly the exception—the bulk of rain falls during a short period. For this very reason they will, some day or another, be compelled to rise to the occasion, and make up their minds to construct reservoirs adequate to their wants. By doing so they will very materially assist in raising their gold field to its legitimate position, and which doubtlessly it should have occupied long since. On the other hand, there can be no doubt that they will be handsomely rewarded for their investment of capital in such enterprise.

One of the principal difficulties that have beset mining here is the heavy underground water that is met with all over the field, requiring very powerful machinery to keep it under, and it does appear strange that no attempt should have been made so far to conserve this for mill purposes. A lesson might be learned here from the action taken by the intelligent management of the Mount Morgan mine during the late dearth of water there.

In analyzing the returns for every month the only conclusion that can be arrived at is that in the face of adverse circumstances Croydon has held its own very well. On account of the heavy rains at the commencement of the year, carting to the mills

was rendered a physical impossibility for a couple of months, and then the mills, after being able to run uninterruptedly for four or five months, had at first to shorten work, and then in some cases stop altogether.

Fortunately the treatment of tailings, which are, however, the accumulation of years, and therefore can not be expected to add much longer so largely as they did last year to the total output of gold, gave very satisfactory results. Thirty-seven thousand five hundred and eighty tons were subjected to the cyanide treatment for 33,519 ounces of bullion—equal to 0.252 fine—which reduced to last year's average Croydon standard—0.595 fine—would be equal to 14,196 ounces of ordinary average Croydon gold. On this basis the total output is brought to 69,742 ounces.

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Reviewing mining operations in general for the year, it may be said that the Golden Gate line of reef has taken up the most prominent position, although even here the deep ground remains untouched, as the gold was obtained from above the water level. No particular progress appears to have been made on the True Blue line, although it tops the list of gold producers for the year, whilst on the Highland Mary things have been rather dull. The same must be said to apply to the Iguana Hill division of reefs. Many of the mines on the latter two lines gave splendid yields at one time, but the reefs were lost by either being thrown up or thrown down by the great "fault" that intersects this part of the field, and have not been picked up since.

Some assistance was given to the Iguana Extended claim for the purpose of exploration in this direction, but this money may be considered to have been thrown away as far as results are concerned. I look forward to the thorough geological survey that is in progress at present shedding some light on what is a vastly important question, and that it will afford hints where to look successfully for the lost lodes.

There is a large area of auriferous country, studded with reefs, lying to the eastward from the main center of present operations which should hold out great inducement to enterprise in the future, and if once properly developed, in all probability would largely add to the yield of gold from Croydon.

The outlying district of Esmeralda has not made much advance, but the fact does not by any means preclude the chance of a prosperous future eventually.

So far the bulk of the ores in this district have proved singularly free of refractory combinations and are of a thorough free-milling nature, and therefore should probably be suitable for dry crushing. A company has been formed for the purpose of working a very large body of low-grade ore on this principle. It is proposed to reduce the stone by means of large Krupp mills, and then recover the gold by the cyanide process. If this new departure in milling in this colony should prove a success, and the experiments made so far do not point to any special difficulties, this venture will mark a new era of progress on Croydon, for there are many other lodes that should be amenable to the same process, which must prove especially suitable to a locality that so frequently suffers from want of water.

During the year one of the mines has shipped a fairly large parcel of ore to England, and, if judged from the returns obtained from a trial shipment, will realize about £16 per ton.

There has been a decrease in the number of miners of 165. The average earnings per man has been £174 13s. 2d.

Another gold field that has suffered very severely from the protracted drought is the Etheridge. Want of water on the one hand stopped all reducing operations for a longer or a shorter period, whilst on the other hand the absolute want of feed for draught animals made the cartage of stone to the mills a sheer impossibility. In many localities not a vestige of vegetation beyond trees was to be seen, and maize and other fodder was not procurable. Out of 22 mills 1 had no water for six months, 3 others for seven, 6 for eight, and 2 for twelve months. Amongst the latter is a very *fine one that* has not had enough water to run since its erection, but in this case it is

an open question if an error of judgment was not committed in the selection of site when a permanent supply was available within a couple of miles. The remainder of the batteries not referred to above were hung-up idle from the same cause for one month upwards. The prospect of being able to have stone crushed was so remote as to paralyze mining operations in many instances, or to cause a total cessation of them.

Not one of the large mines came up to 2,000 ounces, and the bulk of the output must be placed to the credit of about 120 of the small mines.

In this way it has come about that only 20,398 tons of stone were put through the stampers for a yield of 18,253 ounces, 14 pennyweights, 12 grains of gold. The total produce of the field is 25,459 ounces, 15 pennyweights, 12 grains, made up of the above quantity with 3,946 ounces, 1 pennyweight (0.507 fine), the result of cyaniding 5,188 tons of tailings, about 1,200 ounces of alluvial, which was principally obtained at Western Creek, the Robertson, and Mount Hogan, mostly by Chinese, and 2,060 ounces taken off old copper plates. The latter item doubtlessly is more or less the product of stone raised in the past. The possibility of such a large yield from such a source throws a curious light on the primitive style of mill-management that must, at any rate, at one period have been in vogue on this isolated gold field. The tailings left for treatment will probably furnish material for another year's operations. Experiments on a large scale are at present being carried on at Castleton with a view of perfecting a new process of extraction of gold from such residues.

It may be said truthfully that the more thriving camps during the year were those where the stone could be taken either direct from the surface or very near to it, or, as the warden puts it very tersely, "where the miners would not lose sight of the sun." In a similar fashion, no doubt, a number of men will make a living here for many years to come; but the full resources of this the most extensive auriferous area in the colony will certainly not be developed until it is connected by a railway with the coast and until mining operations can be conducted on a much more extended scale and in a workmanlike and economical manner, which can only be achieved by capital or co-operation.

I have been reluctantly forced to the conclusion that the only panacea for the development of some of our gold fields that is trotted out daily by people that have only a passing acquaintance with the mining industry—the introduction of foreign capital—has not proved an unmixed blessing in all cases, and I think in the instance of the gold field under review it has wrought positive harm. The putting into circulation of large amounts of money may temporarily enliven trade and permit extravagant salaries to be paid, but if the egregious blunders that have been committed, in the mining sense of the word, by the people that had the spending of this money could be put into print they would fill a volume of sad literature. I need not refer to the evil influence that extravagant expenditure must as a matter of necessity have on the working of other mines in the district. The effect of all this has been to frighten away the investor, and so retard the development of the mines indefinitely.

At the same time the field can not be said even now to be half prospected. In illustration I may point to a fact that occurred only a short time back. Two new arrivals, without any mining experience in particular, applied for a claim on the Racecourse Reserve, a locality frequented by many miners on many occasions, and from the fact that since then ten claims have been taken up on the same line of reef it may be concluded that the discovery must be of some importance.

Many of the mines in the immediate vicinity of Georgetown that have been allowed to lie idle for years have been re-taken up of late with satisfactory results, and another battery in the town has become a necessity.

The deepest mine on the field—1,106 feet on the under lay, equal to 856 feet vertical—has not given very good results after leaving the 600-feet level, having clearly, at any rate for the time, lost the run of gold. The falling off in quantity and quality did not encourage the management to proceed with farther sinking in their shaft, and therefore operations during the year were confined to driving in one of

the levels in a northerly direction with indifferent results. They now propose to revert to sinking once more, with a view of finally determining if a payable reef exists in their lode at an increased depth, if the Government will encourage the undertaking by a grant from the Deep-sinking vote. It is intended to sink another 200 feet at an expenditure of £2,500, half of this to be borne by Government.

The tributers on the Durham reef—one of the first mines taken up on this gold field, and which has seen many ups and downs in its time—after a heavy expenditure met with a large body of stone, which, unfortunately, yielded only 12 pennyweights to the ton, and, being not payable under the circumstances, forced them to terminate their tribute. If for the sake of the valuable machinery on this mine alone, it is to be hoped that it may not be abandoned without further trial. At the Percy, Mount Hogan, Gilberton, Lanes Creek, the Lighthouse, and Goldsmith's matters have been very dull throughout the year. The new battery erected at Oakey Creek has been kept busy with stone from the Jubilee Plunger, an immense body of stone that goes 8 pennyweights of gold to the ton all through as taken from a face. Western Creek has attracted a number of miners during the year, the erection of a mill in the locality having provided the means of obtaining crushings within a more reasonable distance than formerly; but still the low value of the gold there will not permit the working of any but the richest reefs at present. It is needless to say that no additions of consequence have been made to the machinery of late. Some dry blowers were introduced from Westralia, but did not prove a success when applied to the sticky material they had to operate on, though it is understood they do good work in less cohesive stuff.

There are about 300 claims and 113 protection areas on the registers; also 17 gold-mining leases. The latter average only about 7 acres in area, and demonstrate that systematic mining so far is not the rule on this gold field.

The Woolgar Gold Field continues to be worked only in a spasmodic fashion, giving employment principally to men that find it convenient to fill up spare time between other occupations. There is abundance of surface alluvial that should give handsome returns if water can be brought to the spot, which is quite within the range of possibility. The features of the country also favor the supposition that leads may be found on the flats, and there appears to be no cogent reason why this gold field hereafter should not be able to maintain quite as large or even a much larger population than it has done in days gone by. The country is intersected by numerous reefs, many of them with a very fair record, which were abandoned for the attractions of Croydon and other places before they received anything like a fair test, the majority of the shafts having attained no greater depth than 30 or 40 feet.

At Ravenswood, from a combination of circumstances which in no way can be said to reflect unfavorably on the intrinsic merits of the gold fields as a gold-producer, decreases under several important heads have to be recorded. The stone raised was nearly 500 tons short, and the returns from it a little over 1,800 ounces, when compared with the previous year. The average per ton also has fallen by nearly 2 pennyweights, but this fact is mainly due to one of the old mines that has been started once more under new auspices and provided with improved machinery, having put through 1,500 tons of 3-pennyweight stuff. The deficiency from alluvial mining is more than 800 ounces. These deposits may be considered for all practical purposes to be exhausted, and the mere fact that the Chinese are leaving the ground goes a long way toward proving the correctness of this view. The chances of new alluvial ground being opened are very remote, as every likely spot all over the field has been pretty well tried. A small number of men continue digging about Mount Wyatt with indifferent results, whilst a few others are collecting stuff about the heads of Stoney Creek for sluicing during wet weather.

The future prosperity of Ravenswood must be looked for in its wealth that doubtlessly lies hidden in its numerous lodes; but these can only be hoped to be exploited *by systematic* and economic methods of mining, which in the first instance means, *as a rule, capital* beyond ordinary individual resources, and then the extraction of

the gold from the refractory ores by the most thorough and at the same time the least costly process. This can not be said to have been the case hitherto, but if the large sums of money that at different times have been expended without success have done no other good, they have at least shown the way how not to do it, and there should be every prospect now that all this dearly-bought experience may be yet put to good use in the future.

Two events of the year call for special reference. On the John Bull leases a new straight shaft has been put down, with the result of striking a large payable reef at something over 600 feet. The Old Man mine, that has been worked off and on for many years with indifferent results, has been acquired by a new proprietary that is prepared to work this immense lode as it ought to be done—on an extensive scale—and to do so advantageously has provided adequate reducing and modern gold-saving appliances on the mine, which will remove the principal obstacle that has stood in the way of success up to now; that is, the heavy cost of transport of the stone to the mills.

Another pleasing feature of the year has been the energetic way—and this in the face of many difficulties, among which insufficient capital has not been the least—in which the Grant and the Black Jack leases have been worked, having given employment to about half a hundred of miners, independently of the large number of other men whose labor is required in the treatment and transport of the ore, fuel, and other material.

Reviewing the work done at the outside camps, mining at Rochfort clearly stands out prominently as the most successful during the year. The Hadleigh Castle, with its 4-feet mundic lode, had an output of 3,749 tons of 15 pennyweight stone, and employed 33 men. The little public battery there also put through about 1,500 tons of stone for over 1,000 ounces of gold, exclusive of another couple of hundred ounces that were recovered by the small cyanide plant connected with the mill. There are several promising mines in this district that no doubt with an advanced method of mining, which the application of capital alone can make possible, would materially add to its importance as a mining center.

Hillsborough, although having not passed as yet to the stage of very primitive appliances and methods, has given fairly good results to about 30 men. At the Fanning Siding, and at what is known as the Far Fanning, at Argentine, Trieste, Fish Creek, the Kirk, Nolan's Gully, Donnybrook, Dreghorn, and Piccadilly, a small number of men in each locality has been engaged in mining for gold, and although the returns do not disclose any very heavy yields, it may be presumed that these men are satisfied with the results of their operations. Fish Creek holds out inducements for further prospecting, and Piccadilly also should be able to afford work for perhaps 50 men that would be content with making a fair living.

Although some machinery has been removed from the field during the year, new additions have more than made up for this. The European population has increased, whilst the number of Chinese shows a decrease. The total product has been 14,019 ounces of gold of a value of within a shade of £50,000.

Several mines, such as the Wild Irish Girl, the Shelmalier, the Saratoga, and the Scandinavian, and a few others continue to send their ores to Aldershot for treatment. Some send their ore in bulk, while others dress theirs on the spot, and some of these parcels have yielded as much as 7 ounces to the ton, which after deducting all charges would leave about 6 ounces to the owner of the mine.

The proposition of sinking a shaft 1,000 feet deep at Ravenswood in a position where it is most probable to prove the deep ground, amongst a cluster of well-known reefs, is likely to be carried out, and if this is done it will be the first instance within my knowledge where a foreign company has been formed solely for the purpose of *bona fide* prospecting. Such enterprise deserves to succeed, and should have better chances of doing so than many mines with nothing but their splendid records of the past that have been put before the public.

The mining *industry in the* Gladstone district has proved no exception to the dire

effects of an adverse season felt elsewhere. Alluvial mining has been only practicable during a fraction of the year, and the yield from this source was consequently reduced to 1,290 ounces. The number of alluvial miners is given as 220 whites and 34 Chinese. The majority of the latter abandoned their occupation when water was getting short, and betook themselves further north. Some of these, however, must have been pretty successful prior to this, one of them having obtained as much as 23 ounces in one piece. Alluvial deposits are widely scattered over this district, and they should give employment to a number of men for years to come in anything like normal seasons, and I have little doubt that, with the advent of the wet season, many have returned to the scenes of their former labors, such as Calliope, Canal, Kroombit, Eastern Boyne, Sneaker's, Norton, Langmorne, and Raglan. It is also not at all improbable that payable gold may yet be found between the latter place and Mount Larcombe.

In reviewing the operations at the reefing centers we meet a big falling-off at Monal. Scarcity of water restricted mining operations, whilst on the other hand the necessity to work at greater depths now has contracted enterprise, at any rate, for a time. At Calliope the renewed activity noticeable at the beginning of the year was not maintained, but the recent proposal of a syndicate to sink a shaft 400 feet deep should be sufficient to disclose the true capabilities of the place, and, if satisfactory, may lead to more extended operations in the future.

Barmundoo, and Crow's Nest, which is 6 miles distant from the former place, have shown increases both in stone and gold. The latter locality produced a 20-ton crushing, yielding 181 ounces of gold. The lodes here are rather small, and unfortunately patchy at the same time, but the chief drawback appears to lie in the intractable nature of the ore. In illustration of this fact I may quote that in one instance 13 tons of stone yielded at the mill 57 ounces of gold, but about 5 tons of tailings saved contained a further 32 ounces. The want of an assayer must doubtlessly be felt in a locality like this. His advice, based on accurate assays of fair average samples, would at once be a guide how to deal with the different parcels of ore raised, and settle any doubts forthwith that may exist on the point if it would prove more remunerative to send them to the smelter, or have to be satisfied with such results as the ordinary amalgamation process offers.

At Mount Jacob, where there were 4 claims at work, a small battery has been erected saving the miners, in the future, 22 miles of carriage of their stone raised, an item which may be just the margin between a payable crushing and otherwise.

At Mount Rainbow, where there were 2 reward claims and 17 prospecting protection areas, the battery has started work again.

At Norton the little work done was of a desultory kind, but the owner of the battery there is providing himself with a small chlorination plant.

Quartz has also been worked in a small way in many other places, but so far the erection of batteries in these localities is not warranted; only rich patches could be dealt with, such as did pay for dollying.

The total yield from the Gladstone fields has been of a value of a little over £25,000, being made up by 5,593 ounces of gold from 4,882 tons of stone and 1,290 ounces from alluvial.

On the whole, the prospects for the future appear to be satisfactory.

Our only alluvial gold field of any appreciable extent at the present time, Peak Downs, has in the face of a very adverse season produced excellent results, and in fact has rather established a record for the output of 11,986 ounces is 4,678 ounces ahead of the previous year. At the beginning of the latter the population was added to day by day by new arrivals, but when a little later on a scarcity of water made itself felt, the departures very soon outnumbered the newcomers, so that at the close of the year a diminution in the number of miners of nearly 200 had taken place. The rainfall was confined altogether to the first quarter and a few good storms that occurred toward the close of the year.

At Macdonald's Flat, which is the center of a very considerable auriferous area, a

good deal of gold was obtained until the absence of water, both for mining and even domestic purposes, had the effect of driving the men to other camps more favorably situated.

The Mines Department has granted some monetary assistance to the miners in this locality toward the cost of the excavation of a large tank and dam of considerable capacity. This undertaking was started too late in the season to be of any service during the drought experienced, but is bound to prove of much value in the future, if the miners will only complete the undertaking, although some rain has lately fallen. The sinking here has varied from 60 to 90 feet, with the exception of one shaft that was carried down to a depth of 120 feet, with the result, however, of bottoming on a blank. The first heavy fall of rain will doubtlessly be the signal to a number of men to return to their old workings.

The Springs and Black Ridge camps were the most populous during the latter portion of the year on account of the wells having proved equal to the occasion, and although water can not by any means be said to have been plentiful, still there was enough to cover absolute necessities. Many of the Macdonald's Flat men located themselves here for a time, and no doubt the bulk of the gold raised was obtained in these localities.

The Miclere shows steady progress, owing, no doubt, to a great extent, to the prudence, common sense, and forethought of the men there. They have provided themselves with several good dams and wells, and are therefore always prepared for a dry season. They also maintain amongst themselves always a small prospecting party to secure new localities for future operations.

A few small parties have also been mining near Copperfield, at McMaster's, on Sandy Creek, and at a place known as the Hospital Rush.

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for this the drought must be held responsible. The very extensive deposits of gold in this locality are bound to secure a prosperous future, and that era will commence as soon as the water difficulty can be successfully grappled with. The small population of about 60 has done wonders in a comparatively small way, as is testified by about 30 miles of water-races, at an expenditure that can not fall much short of £4,000. But to develop the full resources of such a gold field a much larger scheme will have to be resorted to. With such an object in view an exhaustive survey was executed during the year, but the levels ascertained disclose the fact that the elevation of the source from which a large and constant supply could be obtained is insufficient to give the necessary fall to produce the pressure that is the *sine qua non* in hydraulics. If the proposed scheme would have proved practicable, the considerable expenditure involved by it would have given lucrative employment to many men.

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The quantity of stone raised was 2,764 tons. The population numbers about 1,000, of which 120 are returned as miners. The falling off in the gold field's revenue has been considerable, amounting to nearly £400.

The other gold fields in the Burnett, which comprise Paradise and Mounts Shamrock and Steadman, have produced 1,372 tons of stone for 1,280 ounces of gold. The former place cannot be said to have come up to the expectations that were deemed warranted by many at its opening. There are several claims that should prove remunerative to the practical miner who can combine experience in working with strict economy. It must be considered, however, an open question if reefs that do not often exceed 15 pennyweights per ton, and that have only in very exceptional ones run from 1½ to 2 ounces—that is, if last year's returns can be accepted as a measure—would pay for working on an extended scale, when the size of the reef is taken into account, and would involve a large initial expenditure.

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The population of the Palmer, at one time the leading gold field, with 20,000 men employed on it, has dwindled down to 500, quite half of this number being Chinamen. Only 502 tons of quartz were crushed for 474 ounces of gold. The yield from alluvial workings may be set down at 1,000 ounces, but this estimate is probably under the actual quantity obtained. None of the lines of reef that were worked in the olden days have had any work done on them, and although some of these have had a very fair record, they have evidently not had any charm for the investor.

Some ferruginous deposits of considerable dimensions are being prospected at present near Oakey Creek, in proximity to some of the gullies that produced such very heavy gold in 1874 and 1875, when, I may say in illustration of this fact, one man intrusted to my safekeeping 340 ounces of gold in water-worn pieces from 10 ounces in weight upwards obtained within one week, and where I saw 16 ounces of gold washed from one dish of dirt. If the gold contents of these ironstone deposits are as good as reported—that is, from 5 pennyweights to 3½ ounces per ton—an immense fortune should be within reach of the discoverer. However, even this discovery will not aid much in solving the geological puzzle of what became of the lower continuations of the reefs that shed 55 tons of gold on the small flats and into the gullies of the Palmer watershed.

In the Limestone district work otherwise than alluvial has been chiefly confined to the Anglo-Saxon mine. The output from this and four claims has been 1,118 tons for *813 ounces of gold.* The stone in the lease was raised by tributors with payable

results to themselves. The other work done in the mine was the sinking of a winze and driving prospecting levels, and assistance from the Deep-sinking fund was granted toward it. The result has been very unsatisfactory, as operations were evidently based on a thorough misconception of existing geological conditions. The alluvial gold obtained in this district was probably 500 ounces or more.

At the Coen, a new reef, the Trafalgar was opened up last August, and this has furnished since 167 tons of quartz, yielding 531 ounces of gold, worth over 60s. per ounce. The total output of this little field has been 2,622 tons for 3,953 ounces, to which must be added about 1,000 ounces of alluvial gold, principally from Rocky River. The combined population of the latter place and Coen is estimated at 360, and these may be taken as fairly prosperous communities, seeing that they have been quite self-supporting, and without the extraneous support of non-resident contributing shareholders and backers.

Quartz reefs have also been found at Rocky River, but prospecting for such is naturally much hampered in a locality that in many places is covered by a dense jungle, and years probably will have to elapse before the full capabilities of the locality in this direction can be thoroughly known.

The little of the gold-mining industry that has been carried on in the Cooktown district is fast retrograding, having been represented by only 12 Europeans and 15 Chinese. The product of Cocoa Creek has been 138 ounces and from the Starcke 52 ounces, and the prospects for the future can hardly be regarded as brilliant.

At Mount Perry, the only gold mines at work were the Reid's Creek Gold Mining Company, which have 30 tons of stone, rather difficult of treatment, at Grass; and the New Normanby, which sent 54 tons of ore to Aldershot for a return of 121 ounces of gold. About 35 men, European and Chinese, have been fossicking about Reid's and Chinamen's Creeks and the purchase of gold from these sources by local tradesmen amounted to 384 ounces. Quite a number of protection areas were applied for, but none of these had to be renewed.

I regret to be compelled to record that mining at Cloncurry has made no progress, and the little work done must be summed up as having been more or less of a fossicking nature, consisting of turning over old workings at the Top Camp, the Two Mile, and Pumpkin Gully. Few nuggets were found at the Fifteen Mile, but taken all in all, the work done can not have been very remunerative to the men engaged in it. The last two localities referred to were chiefly the scene of labor of the few Chinese in this district.

On the Leichhardt Provisional Gold Field a score of men or so have been working the alluvial found there in the beginning of the year, but I fear with rather indifferent success. When Sunday Gully there was opened at first a goodly number of men migrated there, but after trial the "find" did not present sufficient attractions to keep them long. The only quartz claim in the vicinity, the Gertrude P. C., continues to give very good results from the small but very rich leader in this ground. That gold exists over a very large area in this district goes without saying, and important discoveries are quite within the range of possibilities.

About 60 quartz miners are located in the comparatively recently discovered Provisional Gold Field of Bower Bird, situated about 160 miles as the crow flies south from Burketown. More than 20 claims have been registered already, and a small battery is in course of erection. A trial lot of a few tons was taken under difficulties and much expense to the nearest mill, which is 30 miles south from Cloncurry township, and gave excellent results, and if the stone raised hereafter should average one-half, or even one-third of this first crushing, the new gold field should have very good prospects ahead. The distance by road to Cloncurry is about 100 miles in a south-easterly direction. That both miners and tradesmen have faith in the future of the place may be seen at a glance at the substantial buildings that have been erected there already.

About 20 men are working alluvial deposits not far from the main camp, and it is expected that their number will be largely augmented with the setting in of the *wet season.*

Some *bona fide* prospecting is contemplated with a view of testing virgin country so far untouched by the prospector. A prospecting protection area is also in force on Agate Downs.

Machinery for the treatment of the accumulation of old tailings at the Gilded Rose mine at Bishop's Creek has arrived on the ground, and if the cyanide process should turn out a similar success as it has done in other places it should increase, at any rate for a time, the yield of gold from the Cloncurry, which during the past year has dwindled down to about 1,200 ounces from alluvial. The 185 ounces from quartz was the product of 18 tons of stone which was brought from the Leichhardt and Bower Bird provisional fields.

On Horn Island, which is a member of the Prince of Wales Group, near Cape York, and which was proclaimed a gold field during 1894 in consequence of some alluvial found there, half-a-dozen lines of reef were discovered during the year. Since then the alluvial workings, which furnished about 600 ounces of gold, were abandoned in favor of the new find, which has attracted about 100 men. So far it would be hardly wise to pronounce an opinion on the absolute value of the discovery, as this, to a large extent, must be contingent on the proportions and the standard of the gold contents of the ore. Two trial lots have been sent south for treatment, and yielded 5¼ ounces and 2 ounces per ton, respectively. The gold is of rather low standard, averaging about 0.640 fine, being largely alloyed with silver. The ore is said to be of a somewhat refractory nature in consequence of the heavy lead contents accompanying it, and therefore is, perhaps, not very amenable to ordinary amalgamation; but on the other hand this circumstance should stamp it as an excellent smelting ore. From the geographical position of Horn Island, where water-carriage is so close at hand, this fact should not prove the drawback that ores of this kind present to the far inland miner. A 5-head battery is nearly completed, and the island miners should not be kept in long suspense, as far as ordinary mill treatment is concerned, as to their future prospects. A thorough geological examination of the island will take place shortly.

The returns from the Normanby are the lowest on record, viz, 216 tons for 143 ounces of gold from quartz and 304 ounces from alluvial. Some of the latter was, however, clearly the product of Mount Wyatt, and therefore should go to the credit of the Ravenswood district. One lease application and five claims remain good on the registers, but looking at the output of the year the conclusion that but very little work has been done becomes inevitable. Whatever the intrinsic value of this little field may be, it is clear that the practical determination of it is beyond the scope of the resources of the ordinary miner, who, as a rule, has neither the means to initiate economical mining, such as is evidently required in a place like this, nor the required training which is quite as indispensable as the capital. It was confidently expected that a grant of subsidy from the Deep-sinking vote would be claimed for the locality, but there is evidently an absence of local men in the district endowed with sufficient faith in its resources such as would counsel the embarkation of some capital in its development.

In the Mackay district mining matters have assumed a somewhat brighter aspect than that presented by the previous year. At Grasstree the Zelma has resumed active work and has given employment to about a score of tributors. The auriferous deposits are so extensive as allowing to be quarried, and hence easily and inexpensively raised, and they are said to assay for half an ounce per ton, so that with the example of Mount Leyshon, near Charters Towers, before them, showing what can be accomplished in the way of cheap mining when large deposits can be operated on, the long-delayed success should be within easy grasp if only an adequate supply of fresh water can be assured. This should not prove such a very difficult matter, seeing that at Mount Leyshon the water has to be brought over a longer distance and from an inferior source of supply when compared with their own.

Eungella, too, is looking up, and several claims are at work. It is proposed to utilize the water in the Broken River, which can furnish an unlimited supply, to

effects of an adverse season felt elsewhere. Alluvial mining has been only practicable during a fraction of the year, and the yield from this source was consequently reduced to 1,290 ounces. The number of alluvial miners is given as 220 whites and 34 Chinese. The majority of the latter abandoned their occupation when water was getting short, and betook themselves further north. Some of these, however, must have been pretty successful prior to this, one of them having obtained as much as 23 ounces in one piece. Alluvial deposits are widely scattered over this district, and they should give employment to a number of men for years to come in anything like normal seasons, and I have little doubt that, with the advent of the wet season, many have returned to the scenes of their former labors, such as Calliope, Canal, Kroombit, Eastern Boyne, Sneaker's, Norton, Langmorne, and Raglan. It is also not at all improbable that payable gold may yet be found between the latter place and Mount Larcombe.

In reviewing the operations at the reefing centers we meet a big falling-off at Monal. Scarcity of water restricted mining operations, whilst on the other hand the necessity to work at greater depths now has contracted enterprise, at any rate, for a time. At Calliope the renewed activity noticeable at the beginning of the year was not maintained, but the recent proposal of a syndicate to sink a shaft 400 feet deep should be sufficient to disclose the true capabilities of the place, and, if satisfactory, may lead to more extended operations in the future.

Barmundoo, and Crow's Nest, which is 6 miles distant from the former place, have shown increases both in stone and gold. The latter locality produced a 20-ton crushing, yielding 181 ounces of gold. The lodes here are rather small, and unfortunately patchy at the same time, but the chief drawback appears to lie in the intractable nature of the ore. In illustration of this fact I may quote that in one instance 13 tons of stone yielded at the mill 57 ounces of gold, but about 5 tons of tailings saved contained a further 32 ounces. The want of an assayer must doubtlessly be felt in a locality like this. His advice, based on accurate assays of fair average samples, would at once be a guide how to deal with the different parcels of ore raised, and settle any doubts forthwith that may exist on the point if it would prove more renumerative to send them to the smelter, or have to be satisfied with such results as the ordinary amalgamation process offers.

At Mount Jacob, where there were 4 claims at work, a small battery has been erected saving the miners, in the future, 22 miles of carriage of their stone raised, an item which may be just the margin between a payable crushing and otherwise.

At Mount Rainbow, where there were 2 reward claims and 17 prospecting protection areas, the battery has started work again.

At Norton the little work done was of a desultory kind, but the owner of the battery there is providing himself with a small chlorination plant.

Quartz has also been worked in a small way in many other places, but so far the erection of batteries in these localities is not warranted; only rich patches could be dealt with, such as did pay for dollying.

The total yield from the Gladstone fields has been of a value of a little over £25,000, being made up by 5,593 ounces of gold from 4,882 tons of stone and 1,290 ounces from alluvial.

On the whole, the prospects for the future appear to be satisfactory.

Our only alluvial gold field of any appreciable extent at the present time, Peak Downs, has in the face of a very adverse season produced excellent results, and in fact has rather established a record for the output of 11,986 ounces is 4,678 ounces ahead of the previous year. At the beginning of the latter the population was added to day by day by new arrivals, but when a little later on a scarcity of water made itself felt, the departures very soon outnumbered the newcomers, so that at the close of the year a diminution in the number of miners of nearly 200 had taken place. The rainfall was confined altogether to the first quarter and a few good storms that occurred toward the close of the year.

At Macdonald's Flat, which is the center of a very considerable auriferous area, a

good deal of gold was obtained until the absence of water, both for mining and even domestic purposes, had the effect of driving the men to other camps more favorably situated.

The Mines Department has granted some monetary assistance to the miners in this locality toward the cost of the excavation of a large tank and dam of considerable capacity. This undertaking was started too late in the season to be of any service during the drought experienced, but is bound to prove of much value in the future, if the miners will only complete the undertaking, although some rain has lately fallen. The sinking here has varied from 60 to 90 feet, with the exception of one shaft that was carried down to a depth of 120 feet, with the result, however, of bottoming on a blank. The first heavy fall of rain will doubtlessly be the signal to a number of men to return to their old workings.

The Springs and Black Ridge camps were the most populous during the latter portion of the year on account of the wells having proved equal to the occasion, and although water can not by any means be said to have been plentiful, still there was enough to cover absolute necessities. Many of the Macdonald's Flat men located themselves here for a time, and no doubt the bulk of the gold raised was obtained in these localities.

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In the Limestone district work otherwise than alluvial has been chiefly confined to the Anglo-Saxon mine. The output from this and four claims has been 1,118 tons for *813 ounces of gold. The stone* in the lease was raised by tributors with payable

results to themselves. The other work done in the mine was the sinking of a winze and driving prospecting levels, and assistance from the Deep-sinking fund was granted toward it. The result has been very unsatisfactory, as operations were evidently based on a thorough misconception of existing geological conditions. The alluvial gold obtained in this district was probably 500 ounces or more.

At the Coen, a new reef, the Trafalgar was opened up last August, and this has furnished since 167 tons of quartz, yielding 531 ounces of gold, worth over 60s. per ounce. The total output of this little field has been 2,622 tons for 3,953 ounces, to which must be added about 1,000 ounces of alluvial gold, principally from Rocky River. The combined population of the latter place and Coen is estimated at 360, and these may be taken as fairly prosperous communities, seeing that they have been quite self-supporting, and without the extraneous support of non-resident contributing shareholders and backers.

Quartz reefs have also been found at Rocky River, but prospecting for such is naturally much hampered in a locality that in many places is covered by a dense jungle, and years probably will have to elapse before the full capabilities of the locality in this direction can be thoroughly known.

The little of the gold-mining industry that has been carried on in the Cooktown district is fast retrograding, having been represented by only 12 Europeans and 15 Chinese. The product of Cocoa Creek has been 138 ounces and from the Starcke 52 ounces, and the prospects for the future can hardly be regarded as brilliant.

At Mount Perry, the only gold mines at work were the Reid's Creek Gold Mining Company, which have 30 tons of stone, rather difficult of treatment, at Grass; and the New Normanby, which sent 54 tons of ore to Aldershot for a return of 121 ounces of gold. About 35 men, European and Chinese, have been fossicking about Reid's and Chinamen's Creeks and the purchase of gold from these sources by local tradesmen amounted to 384 ounces. Quite a number of protection areas were applied for, but none of these had to be renewed.

I regret to be compelled to record that mining at Cloncurry has made no progress, and the little work done must be summed up as having been more or less of a fossicking nature, consisting of turning over old workings at the Top Camp, the Two Mile, and Pumpkin Gully. Few nuggets were found at the Fifteen Mile, but taken all in all, the work done can not have been very remunerative to the men engaged in it. The last two localities referred to were chiefly the scene of labor of the few Chinese in this district.

On the Leichhardt Provisional Gold Field a score of men or so have been working the alluvial found there in the beginning of the year, but I fear with rather indifferent success. When Sunday Gully there was opened at first a goodly number of men migrated there, but after trial the "find" did not present sufficient attractions to keep them long. The only quartz claim in the vicinity, the Gertrude P. C., continues to give very good results from the small but very rich leader in this ground. That gold exists over a very large area in this district goes without saying, and important discoveries are quite within the range of possibilities.

About 60 quartz miners are located in the comparatively recently discovered Provisional Gold Field of Bower Bird, situated about 160 miles as the crow flies south from Burketown. More than 20 claims have been registered already, and a small battery is in course of erection. A trial lot of a few tons was taken under difficulties and much expense to the nearest mill, which is 30 miles south from Cloncurry township, and gave excellent results, and if the stone raised hereafter should average one-half, or even one-third of this first crushing, the new gold field should have very good prospects ahead. The distance by road to Cloncurry is about 100 miles in a south-easterly direction. That both miners and tradesmen have faith in the future of the place may be seen at a glance at the substantial buildings that have been erected there already.

About 20 men are working alluvial deposits not far from the main camp, and it is expected that their number will be largely augmented with the setting in of the *wet season.*

Some *bona fide* prospecting is contemplated with a view of testing virgin country so far untouched by the prospector. A prospecting protection area is also in force on Agate Downs.

Machinery for the treatment of the accumulation of old tailings at the Gilded Rose mine at Bishop's Creek has arrived on the ground, and if the cyanide process should turn out a similar success as it has done in other places it should increase, at any rate for a time, the yield of gold from the Cloncurry, which during the past year has dwindled down to about 1,200 ounces from alluvial. The 185 ounces from quartz was the product of 18 tons of stone which was brought from the Leichhardt and Bower Bird provisional fields.

On Horn Island, which is a member of the Prince of Wales Group, near Cape York, and which was proclaimed a gold field during 1894 in consequence of some alluvial found there, half-a-dozen lines of reef were discovered during the year. Since then the alluvial workings, which furnished about 600 ounces of gold, were abandoned in favor of the new find, which has attracted about 100 men. So far it would be hardly wise to pronounce an opinion on the absolute value of the discovery, as this, to a large extent, must be contingent on the proportions and the standard of the gold contents of the ore. Two trial lots have been sent south for treatment, and yielded 5½ ounces and 2 ounces per ton, respectively. The gold is of rather low standard, averaging about 0.640 fine, being largely alloyed with silver. The ore is said to be of a somewhat refractory nature in consequence of the heavy lead contents accompanying it, and therefore is, perhaps, not very amenable to ordinary amalgamation; but on the other hand this circumstance should stamp it as an excellent smelting ore. From the geographical position of Horn Island, where water-carriage is so close at hand, this fact should not prove the drawback that ores of this kind present to the far inland miner. A 5-head battery is nearly completed, and the island miners should not be kept in long suspense, as far as ordinary mill treatment is concerned, as to their future prospects. A thorough geological examination of the island will take place shortly.

The returns from the Normanby are the lowest on record, viz, 216 tons for 143 ounces of gold from quartz and 304 ounces from alluvial. Some of the latter was, however, clearly the product of Mount Wyatt, and therefore should go to the credit of the Ravenswood district. One lease application and five claims remain good on the registers, but looking at the output of the year the conclusion that but very little work has been done becomes inevitable. Whatever the intrinsic value of this little field may be, it is clear that the practical determination of it is beyond the scope of the resources of the ordinary miner, who, as a rule, has neither the means to initiate economical mining, such as is evidently required in a place like this, nor the required training which is quite as indispensable as the capital. It was confidently expected that a grant of subsidy from the Deep-sinking vote would be claimed for the locality, but there is evidently an absence of local men in the district endowed with sufficient faith in its resources such as would counsel the embarkation of some capital in its development.

In the Mackay district mining matters have assumed a somewhat brighter aspect than that presented by the previous year. At Grasstree the Zelma has resumed active work and has given employment to about a score of tributors. The auriferous deposits are so extensive as allowing to be quarried, and hence easily and inexpensively raised, and they are said to assay for half an ounce per ton, so that with the example of Mount Leyshon, near Charters Towers, before them, showing what can be accomplished in the way of cheap mining when large deposits can be operated on, the long-delayed success should be within easy grasp if only an adequate supply of fresh water can be assured. This should not prove such a very difficult matter, seeing that at Mount Leyshon the water has to be brought over a longer distance and from an inferior source of supply when compared with their own.

Eungella, too, is looking up, and several claims are at work. It is proposed to utilize the water in the Broken River, which can furnish an unlimited supply, to

drive a water-wheel of large dimensions, by which means the economical treatment of the ore raised should be much facilitated.

The apparently apathetic nature of the miners in the Warwick district makes it simply impossible to keep anything like an accurate record of their doings. The stone crushed is given at 698 tons, and the returns at 554 ounces. If these figures are reliable, 552 ounces must have been obtained from other sources, probably mostly alluvial, as the local banks purchased 1,106 ounces during the year. It is not unlikely that a little gold from the Stanthorpe district may be included in this. The importance of these little fields is not such as to warrant so far the appointment of a special officer who could move about to see for himself; but it is hard to understand how the miners can stand so much in their own light by neglecting freely and carefully to supply the Warden at Warwick with the few statistical items which require to be collected, principally for their own ultimate benefit. That these localities have not had anything like a thorough trial can not be denied, nor another fact that such is not likely to be accomplished without the aid of capital; but that the section of the community more intimately interested in the development of these mines should decline to assist in bringing them officially into some prominence before the investing public seems simply to be incomprehensible.

The Mulgrave has not contributed to the gold output during the year, though it may reasonably be expected that such will be the case during the present one. One machine has been in course of erection at the Upper Camp for some time, and another is likely to be erected at Butcher's Creek. The Walter Hodgson Mine has been floated into a company in England, and a 10-head stamper mill has been ordered for it in the colony, and it is to be hoped that this venture will eventuate in an unqualified success as a fitting reward for the indomitable enterprise and energy of the man who under almost insurmountable difficulties has brought the mine so near the realization of his anticipations.

Mining in the mineral districts remains in a thoroughly healthy state, but, as was inevitable from the continuation of extremely low values in the metal market, the prevailing conditions did neither stimulate a large output nor warrant vigorous development of the numerous splendid mines that at present, unfortunately, can only be viewed as extremely valuable assets of the future. With few exceptions, only enough work was done to preserve a title to the land, or to provide means for current expenditure, and nothing but a substantial advance in prices will terminate the existing "from-hand-to-mouth" style of mining that is forced on the industry by such unfavorable conditions.

The total produce of the Herberton district for the year may be summarized as 1 09[illegible] tons of lode and 424 tons of stream tin, valued at £43,800. The silver ores raised represent a value of £11,647, those of copper of £9,945, and wolfram £462. This shows a decline in the total value of all metals produced, when compared with the previous year, of a little more than £21,000. However, tin-mining is principally responsible for this heavy drop, and the reasons for this lie ready to hand. The almost total absence of natural feed for draft animals made cartage of the ore to the mills a matter of more than unusual difficulty, if not an impossibility altogether; and this fact alone will more than account for the couple of hundred tons of lode tin short in the output.

In connection with the quantity of stream tin, it should not be forgotten that the previous year has been an exceptionally favorable one for the streamers, an abundant supply of water having enabled them to operate on large accumulations of stacked dirt, but in 1895 there were no such heaps left over from a previous season to win the tin from, and hardly enough water to wash up the produce of the year. Therefore the deficit was not unexpected.

Copper shows somewhat improved returns, and there certainly is no falling off in the productiveness of the mines.

There has been hardly any systematic mining for silver, and the little that has been done may be said to have been confined to Motalbion, whilst the copper must

go to the credit of Chillagoe. The decline in the output of silver, however, is only equal to 9 per cent. Still, mining in this district has been highly remunerative in some cases during this period of comparative inactivity. The Vulcan Tin-Mining Company, at Irvinebank, was able to pay £9,850 in dividends to its shareholders, having put 665 tons of ore through its smelting works for a return of £40,300 worth of ingot tin.

A.—TOTAL PRODUCT FOR THE YEAR OF AURIFEROUS QUARTZ AND ALLUVIAL MINING IN QUEENSLAND.

[Annual Report, Queensland, 1894, p. 20.]

Gold fields.	Yield for 1893.	Yield for 1894.	Increase, 1894.	Decrease, 1894.
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*
Charters Towers	259,243	256,042	9,631	.....
Tailings	.....	12,832		
Clermont	5,963	7,308	1,345	.....
Cloncurry	1,200	1,880	680	.....
Coen	3,853	5,688	1,835	.....
Cooktown Fields	873	679	.....	194
Croydon	71,121	72,136	10,087	.....
Tailings	.....	9,072		
Eidsvold	7,352	4,925	.....	2,427
Etheridge and Woolgar	29,385	24,142	.....	4,280
Tailings	.....	963		
Gladstone Fields	8,684	8,653	.....	31
Gympie, Kilkivan, and Glastonbury	78,978	111,168	32,190	.....
Hodgkinson	1,831	2,264	433	.....
Mareeba	1,771	4,568	2,797	.....
Mackay Fields	1,811	941	.....	870
Mulgrave	.....	50	50	.....
Normanby (Bowen)	953	597	.....	356
Palmer	3,280	3,425	145	.....
Paradise	1,291	3,104	1,813	.....
Pikedale, Talgai, Tenningering, Mount Shamrock, and other small fields	1,650	3,051	1,401	.....
Ravenswood	9,288	16,631	7,343	.....
Rockhampton	122,181	123,497	1,316	.....
Russell	2,150	1,815	.....	335
Russell extended	238	1,148	910	.....
Other sources, treated at different works	3,844	2,932	.....	912
Total	616,940	679,511	71,976	9,405
Increase	.....	.....	62,571	.....

B.—ESTIMATED YIELD OF GOLD FROM QUEENSLAND ALLUVIAL AND QUARTZ MINES SINCE THE YEAR 1877, AS SHOWN FROM WARDEN'S REPORTS.

[Annual Report 1894, Queensland, p. 20.]

Year.	Alluvial.	Quartz.	Total.	Year.	Alluvial.	Quartz.	Total.
	Ounces.	*Ounces.*	*Ounces.*		*Ounces.*	*Ounces.*	*Ounces.*
1877	164,778	188 488	353,266	1886	15,361	325,637	340,998
1878	130 574	179,038	309,612	1887	21,700	404,223	425,923
1879	107,402	181,154	288,556	1888	12,099	469,544	481,643
1880	86,082	181,054	267,136	1889	10,287	728,816	739,103
1881	70,821	200,134	270,955	1890	19,069	591,518	610,587
1882	52,038	172,855	224,893	1891	16,021	560,418	576,439
1883	35,327	177,460	212,787	1892	17,039	598,519	615,558
1884	26,175	281,629	307,804	1893	19,292	597,648	616,940
1885	21,936	289,005	310,941	1894	25,938	653,573	679,511

The above table shows an increase in the yield from alluvial of 6,646 ounces, and an increase in the yield from quartz of 62,571 ounces.

M.—RETURN SHOWING THE QUANTITY OF GOLD EXPORTED FROM THE VARIOUS PORTS OF THE COLONY OF QUEENSLAND DURING 1894.

[Annual Report 1894, Queensland, p. 26.]

Ports.	Quantity.	Ports.	Quantity.
	Ounces.		*Ounces.*
Brisbane	112,474	Geraldton	28
Maryborough	6,343	Cairns	10,410
Bundaberg	3,412	Cooktown	a 13,302
Gladstone	7,072	Thursday Island	237
Rockhampton	129,453	Normanton	83,667
Mackay	966	Border customs	12,239
Bowen	661	Total	684,002
Townsville	303,495		

a Includes foreign gold, 1,333 ounces.

N.—TABLE SHOWING YIELD OF GOLD FROM QUARTZ CRUSHED IN THE PRINCIPAL REEFING DISTRICTS OF QUEENSLAND FOR THE PAST FIVE YEARS.

Gold field.	1890.	1891.	1892.	1893.	1894.
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*	*Ounces.*
Charters Towers	164,022	221,003	259,268	256,459	263,874
Croydon	60,368	65,892	64,316	71,121	81,208
Etheridge	24,310	17,568	21,881	29,185	24,105
Eidsvold	15,823	10,733	14,307	7,328	4,865
Gympie	78,044	60,284	82,319	78,978	110,603
Palmer	6,860	10,721	6,244	2,157	2,042
Ravenswood	14,731	12,486	10,933	8,095	15,083
Rockhampton	226,240	147,691	124,810	122,181	123,489
Total	590,398	546,378	584,078	575,504	625,219

O.—TABLE SHOWING TOTAL YIELD OF REEF GOLD AND NUMBER OF QUARTZ MINES, ETC., ON THE SIX PRINCIPAL REEFING DISTRICTS OF THE COLONY OF QUEENSLAND DURING THE YEAR 1894.

[Annual Report 1894, Queensland, page 27.]

Gold field.	Yield of gold in ounces.	Number of miners working during the year.	Average yield per miner.	Average earnings of quartz miners.
			Oz. dwt. gr.	£ *s. d.*
Charters Towers	263,874	2,740	96 6 2	337 1 3
Croydon	72,136	968	74 10 10	178 17 0
Croydon Tailings	9,072	.....	9 7 10	10 2 3
Etheridge	24,105	420	57 7 20	160 14 0
Gympie	110,603	1,420	77 17 19	275 10 8
Ravenswood	15,033	429	35 0 20	131 8 1
Rockhampton	123,489	1,200	102 18 3	411 12 7
Total	618,312	7,177	.....	.....

COMPARATIVE SUMMARY OF TOTAL RESULTS FROM QUARTZ MINING IN ABOVE DISTRICTS FOR 1893 AND 1894.

Year.	Total yield of gold.	Total value at £3 10s. per ounce.	Number of quartz miners.	Average yield of gold per miner.	Average earnings of each miner.
	Ounces.	£ *s. d.*		£ *s. d.*	£ *s. d.*
1893	563,139	1,970,986 10 0	6,982	80 13 0	282 5 11
1894	618,312	2,164,092 0 0	7,177	86 3 1	301 10 7

QUEENSLAND.[1]

Synopsis.

	Ounces.
Total yield to end of 1877	2,646,916
For the year—	
1878	310,247
1879	288,556
1880	267,136
1881	270,945
1882	224,893
1883	212,783
1884	307,804
1885	310,941
1886	340,998
1887	425,923
1888	481,643
1889	739,103
1890	610,587
1891	576,439
1892	615,558
1893	616,940
1894	679,511
1895	623,000

At £3 10s. per ounce.

[1] *Statistics* of Colony of Queensland, 1894, page 319.

PARTICULARS OF THE GOLD AND SILVER MINING OF NEW SOUTH WALES IN 1894.[1]

GOLD.

The value of the gold won from the opening of our gold-fields to the end of 1894 is £41,010,658 18s. 5d. The quantity and value won last year was 324,787 ounces, valued at £1,156,717 7s. 7d., being the largest yield of any year since 1873, and amply bears out my anticipations of 1893. I think it might now be fairly assumed that the policy of the Government in dispatching so many thousands of our unemployed to the gold-fields of the Colony has, in some measure, contributed to this revival in gold-mining, and so also has the amount voted by Parliament for prospecting purposes. These factors, combined with facilities for working the auriferous deposits within private lands, will, it is hoped, have the effect of maintaining, if not still further increasing, our gold yield.

TABLE SHOWING THE QUANTITY AND VALUE OF GOLD WON IN THE COLONY OF NEW SOUTH WALES FROM 1851 TO 1894.

Year.	Quantity.	Value.			Year.	Quantity.	Value.		
	Ounces.	£	*s.*	*d.*		*Ounces.*	£	*s.*	*d.*
1851	144,120	468,336	0	0	1874	270,823	1,040,328	13	6
1852	818,751	2,660,946	0	0	1875	230,882	877,693	18	0
1853	548,052	1,781,172	0	0	1876	167,411	613,190	7	9
1854	237,910	773,209	0	0	1877	124,110	471,418	4	4
1855	171,367	654,594	0	0	1878	119,665	430,033	2	7
1856	184,600	689,174	0	0	1879	109,649	407,218	13	5
1857	175,949	674,477	0	0	1880	118,600	441,543	7	7
1858	286,798	1,104,174	12	2	1881	149,627	566,513	0	0
1859	329,363	1,259,127	7	10	1882	140,469	526,521	12	5
1860	384,053	1,465,372	19	9	1883	123,805	458,508	16	0
1861	465,685	1,806,171	10	8	1884	107,198	395,291	12	5
1862	640,622	2,467,779	16	1	1885	103,736	378,665	0	3
1863	466,111	1,796,170	4	0	1886	101,416	366,294	7	7
1864	340,267	1,304,926	7	11	1887	110,288	394,578	16	3
1865	320,316	1,231,242	17	7	1888	87,503	317,099	12	0
1866	290,014	1,116,403	14	5	1889	119,750	434,079	8	4
1867	271,886	1,053,578	2	11	1890	127,760	460,284	16	2
1868	255,662	994,665	0	5	1891	153,336	558,305	12	3
1869	251,491	974,148	13	4	1892	156,870	569,177	17	4
1870	240,858	931,016	8	6	1893	179,288	651,285	15	8
1871	323,609	1,250,484	15	11	1894	324,787	1,156,717	7	7
1872	425,129	1,643,581	16	11	Total	11,034,397	41,010,658	18	5
1873	361,784	1,395,175	8	7					

[1] From Annual Report of the Department of Mines and Agriculture, New South Wales, for 1894.

QUANTITIES OF GOLD, THE PRODUCE OF NEW SOUTH WALES, RECEIVED INTO THE ROYAL MINT, SYDNEY, DURING 1893 AND 1894, COMPARED.

[Annual Report of the Department of Mines and Agriculture, New South Wales, for 1894, page 33.]

District.	Division.	1893.	1894.	Increase.	Decrease.
		Ounces.	*Ounces.*	*Ounces.*	*Ounces.*
Bathurst	Bathurst	1,363.65	1,129.52	.....	234.13
	Carcoar	5,021.31	3,640.82	.....	1,380.49
	Orange	10,844.00	26,362.58	15,518.58	.....
	Trunkey Creek	137.81	313.62	175.81	.....
	Tuena	144.91	170.41	25.50	.....
	Mount M, Donald	679.96	89.37	.....	590.59
Tambaroora and Turon	Hill End	972.81	1,173.14	200.33	.....
	Tambaroora	284.27	231 00	.....	53.27
	Sofala	5,499.18	5,929.57	430.39	.....
	Stony Creek	57.91	.....	.....	57.91
Mudgee	Mudgee	1,422.82	2,379.01	956.19	.....
	Gulgong	155.13	.....	.....	155.13
	Hargraves	3 98	30.70	26.72	.....
	Wellington	1,164.49	808.72	.....	355.77
Lachlan	Parkes	7,228.59	8,821.05	1,592.66	.....
	Forbes	63.58	87.39	23.81	.....
	Grenfell	634.43	878.20	243.77	.....
	Young	121.58	983.68	862.10	.....
	Temora	312.69	1,909.25	1,596.56	.....
Albert	Wilcannia	975.41	1,386.57	411.16	.....
Southern	Goulburn	178.88	996.77	817.89	.....
	Braidwood	3,951.80	4,288.74	336.94	.....
	Araluen	900.38	1,243.75	343.37	.....
	Shoalhaven	220.44	13.04	.....	207.40
	Nerrigundah	187.26	88.92	.....	98.34
Tumut and Adelong	Adelong	4,920.64	4,508.84	.....	411.80
	Tumut	205.50	232.79	27.29	.....
	Cootamundra	415.56	1,191.34	775.78	.....
	Tumbarumba	2,363.07	2,167.48	.....	195.59
	Gundagai	1,179.50	1,369.79	190.29	.....
	Cooma	848.38	1,074.15	225.77	.....
	Kiandra	288.38	480.80	192.42	.....
	Wagga Wagga	4.91	112.18	107.27	.....
Peel and Uralla	Armidale	30,582.11	24,796.52	.....	5,785.59
	Rocky River	12.77	30.22	17.49	.....
	Tamworth	1,187.90	669.77	.....	518.13
	Bingera	714.05	1,352.02	637.97	.....
Hunter and Macleay	Copeland	58.37	56.76	.....	1.61
Clarence and Richmond	Grafton	716.68	842.02	125.34	.....
New England	Tenterfield	657.55	989.38	331.83	.....
Mixed	Western, northern, and southern.	35,511.58	62,459.88	26,948.30	.....
Localities unknown	.....	48,903.05	57,698.37	8,795.32	.....
	Total	171,097.07	222,988.17	61,936.85	10,045.75

QUANTITIES OF GOLD, THE PRODUCE OF NEW SOUTH WALES, ETC.—Continued.

SUMMARY.

District.	1893.	1894.
	Ounces.	*Ounces.*
Bathurst	18,191.64	31,706.25
Tambaroora and Turon	6,814.17	7,333.71
Mudgee	2,746.42	3,218.43
Lachlan	8,360.67	12,679.57
Albert	975.41	1,396.57
Southern	5,438.76	6,631.22
Tumut and Adelong	10,225.94	11,137.37
Peel and Uralla	32,496.83	26,848.57
Hunter and Macleay	58.37	56.76
Clarence and Richmond	716.68	842.62
New England	657.55	989.38
Mixed—Western, northern, and southern	35,511.58	62,459.88
Localities unknown	48,903.05	57,698.37
Total	171,097.07	222,988.17

From the above statement it is seen that the quantity of gold sent to the mint in 1894 exceeds that of 1893 by 51,891 ounces. The principal increases are under the head of "Mixed Western, northern, and southern" and "Localities unknown," and from the Orange District, due to the splendid returns from the Lucknow mines. The returns from Parkes and Temora also show a satisfactory increase; the increase from Temora is no doubt due to the opening up of the Wyalong and other new fields in that district. It is difficult to account for the large decrease from the Armidale District, as the mines at Hillgrove have been yielding well during the year.

The following table is compiled from information kindly furnished by the collector of customs:

EXPORT OF GOLD, 1894.

[Annual Report of the Department of Mines and Agriculture, New South Wales, for 1894, page 34.]

	Quantity.	Value.
Gold.....ounces..	89,676	£327,102
Quartz tailings and pyrites.....18,439 packages..	.....	45,461
Total.....ounces..	101,799	372,563

The quantity of gold sent to the mint, plus the quantity exported, represents for the year 1894 the quantity of gold won, as none of the gold that passed into the mint during the year was exported. Thus the gold sent to the mint, 222,988.17 ounces, plus the quantity exported, 101,798 ounces 17 pennyweight, equals 324,787.17 ounces. It might be here stated that the Broken Hill Proprietary Silver-mining Company saved 4,079 ounces of gold, valued at £16,300, from their silver smelting operations.

It will be seen from the following table of returns, supplied by the Mining Registrars, of gold won in their respective divisions that their figures exceed those given by the mint by 22,716.62 ounces, but is less than the total yield by 79,083.38 ounces. I am satisfied that the Mining Registrars exercised great care in procuring correct returns, but often they have a difficulty in obtaining information from miners. It does not often happen that the owners of important mines refuse to supply returns, but some of the larger mine-owners in the Cobar District refused to supply details of their gold yield for last year.

RETURNS OF GOLD FOR 1894 FROM MINT AND MINING REGISTRARS COMPARED.

District.	Mint.	Mining registrars.	Excess.	Deficiency.
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*
Bathurst	31,706.32	50,023.56	.....	18,317.24
Tambaroora and Turon	7,333.71	11,444.27	.....	4,110.56
Mudgee	3,218.43	28,439.40	.....	25,220.97
Lachlan	12,679.57	31,106.14	.....	18,426.57
Albert	1,386.57	7,765.94	.....	6,379.37
Southern	6,631.22	23,742.29	.....	17,111.07
Tumut and Adelong	11,137.37	16,115.75	.....	4,978.38
Peel and Uralla	26,848.57	45,964.59	.....	19,116.02
Hunter and Macleay	56.76	959.50	.....	902.74
Clarence and Richmond	842.02	2,885.35	.....	2,043.33
New England	989.38	6,665.00	.....	5,675.62
Cobar	.....	20,593.00	.....	20,593.00
Mixed (North, South, and West)	62,459.88	.....	62,459.88	.....
Localities unknown	57,698.37	.....	57,698.37	.....
Total	222,988.17	245,704.79	120,158.25	142,874.87
				120,158.25
The returns from Mining Registrars exceed returns from Mint by	.....	.....	.....	22,716.62

The Mining Registrars' returns of gold from 1894 show increased yield of only 72,364 ounces over that of 1893, which will show clearly that these returns are not, in spite of the efforts of the Registrars, complete.

MINING REGISTRARS' RETURNS OF GOLD FOR 1893 AND 1894 COMPARED.

[Annual Report of the Department of Mines and Agriculture, New South Wales, for 1894, page 34.]

District.	1893.	1894.	Increase.	Decrease.
	Ounces.	*Ounces.*	*Ounces.*	*Ounces.*
Bathurst	28,313	50,024	21,711	.....
Tambaroora and Turon	11,947	11,444	.....	503
Mudgee	23,941	28,439	4,498	.....
Lachlan	11,853	31,106	19,253	.....
Albert	5,513	7,766	2,253	.....
Southern	15,449	23,742	8,293	.....
Tumut and Adelong	12,026	16,116	4,090	.....
Peel and Uralla	46,322	45,965	.....	357
Hunter and Macleay	1,907	960	.....	947
Clarence and Richmond	4,982	2,885	.....	2,097
New England	4,711	6,665	1,954	.....
Cobar	6,377	20,593	14,216	.....
Total	173,341	245,705	76,268	3,904
Less decrease	.....	.....	3,904	.....
Increase in yield for 1894	.....	.....	72,364	.....

The following statement shows the results obtained from the treatment of parcels of alluvium in several of the mining districts. The Mining Registrars have much difficulty in obtaining the information necessary to compile a complete and correct table of this nature. The miners are either adverse to supply details of their labor or they have *been careless in* keeping data from which it could be supplied. There *must be many thousands* of tons of wash-dirt put through, the yield from which is

never made public, but which should be published in the interest of the miners themselves.

The information collected in 1894 is slightly more complete than that for 1893, but the average yield per ton is considerably less.

COMPARATIVE STATEMENT OF AVERAGE YIELDS FROM ALLUVIAL MINES FOR 1893 AND 1894.

[Annual Report of Department of Mines and Agriculture, New South Wales, for 1894, page 35.]

District.	1893.				1894.			
	Quantity.	Average per ton.		Yield of gold.	Quantity.	Average per ton.		Yield of gold.
	Loads.	*Oz. dwt. gr.*		*Oz. dwt. gr.*	*Loads.*	*Oz. dwt. gr.*		*Oz. dwt. gr.*
Bathurst	10,000	0 0 6		119 0 0	6,400	0 2 7		740 0 0
Clarence and Richmond					120	0 10 4		62 0 0
Cobar	983	0 13 13		665 0 0				
Lachlan	1,624	0 16 3		1,311 0 0	5,307	0 5 16		1,505 15 21
Tumut and Adelong	9,800	0 0 6		124 0 0	2,442	0 1 10		174 4 0
Southern	15,000	0 0 2		68 10 0	96,900	0 0 5		1,042 5 0
Hunter and Macleay					1,100	0 1 13		84 0 0
Mudgee					720	0 8 1		290 0 0
Total	37,407	0 1 5		2,287 10 0	112,989	0 0 17		3,898 4 21

The return following gives particulars of the average yield of sundry parcels of stone crushed in the various mining districts.

Though this return is very far from complete, I must congratulate the Mining Registrars upon the fact that it is an improvement upon previous returns. While the average for the whole of the districts was less in 1894 than in 1893, so far as disclosed by the table, the averages for the Bathurst, Southern, Tumut and Adelong, Hunter and Macleay, Clarence and Richmond, Cobar, and New England are highly satisfactory. It is, however, to be feared that if the results of all the crushings in these districts had been included in the table the averages would not have been so high.

COMPARATIVE STATEMENT OF AVERAGE YIELDS FROM QUARTZ-MINES FOR 1893 AND 1894.

[Annual Report of the Department of Mines and Agriculture, New South Wales, for 1894, page 35.]

District.	1893.				1894.			
	Quantity.	Average per ton.		Yield of gold.	Quantity.	Average per ton.		Yield of gold.
	Tons.	*Oz. dwt. gr.*		*Oz. dwt. gr.*	*Tons.*	*Oz. dwt. gr.*		*Oz. dwt. gr.*
Bathurst	14,248	0 15 2		10,739 0 0	18,660	1 18 18		36,158 2 12
Tambaroora and Turon	2,702	1 2 3		2,991 10 0	4,773	0 9 12		2,268 16 2
Lachlan	2,453	0 13 11		1,648 10 0	51,943	0 4 13		11,784 0 0
Southern	20,405	0 6 16		6,801 10 0	6,059	1 13 23		10,293 7 15
Tumut and Adelong	2,906	1 4 19		3,600 10 0	5,552	1 3 10		6,495 16 20
Peel and Uralla	31,852	1 1 19		34,671 0 0	22,501	0 10 15		11,990 15 0
Hunter and Macleay	361	1 14 14		624 0 0	506	1 1 4		535 5 0
Clarence and Richmond	1,608	1 0 16		1,660 10 0	704	1 3 6		817 15 0
Mudgee	21,476	0 12 10		13,357 0 0	26,953	0 8 17		11,309 18 0
Cobar	7,875	1 2 20		8,992 0 0	11,615	1 3 2		13,410 0 0
New England					1,248	1 14 1		2,125 0 0
Total	105,886	0 16 11		85,085 10 0	149,514	0 14 8		107,188 14 1

SILVER AND LEAD.[1]

As will be seen by the following table, there was a considerable increase in the output of silver and in the value thereof, but in the export of silver-lead ore and metal there was a serious decrease in 1894 as compared with 1893. The value of the aggregate export for 1894 was less by £742,231 than that of 1893. This decrease is due to the low price of silver and lead, which has caused several smaller mines to shut down. Until a satisfactory mode of treating the low-grade ores has been devised or the market price of silver improves, I fear we shall have difficulty in keeping up our export of silver and lead. The colony is much indebted to the Broken Hill Proprietary Company for the efforts made to solve the problem how to treat our low-grade ores profitably, and though they may not have been as successful as might be desired, they have spared neither trouble nor expense, and I hope their efforts will yet be crowned with success.

QUANTITY AND VALUE OF SILVER AND SILVER-LEAD AND ORE EXPORTED.

Year.	Silver.		Silver-lead and ore.							
	Quantity.	Value.	Quantity.						Value.	Total value.
			Ore.				Metal.			
	Ounces.		*Tons.*	*cwt.*	*qr.*	*lb.*	*Tons.*	*cwt.*		
Up to 1881	726,779.14	£178,405	191	13	0	0	.....		£5,025	£183,430
1882	38,618.00	9,024	11	19	0	0	.....		360	9,384
1883	77,065.18	16,488	136	4	0	0	.....		2,075	18,563
1884	93,660.25	19,780	9,167	11	1	7	.....		241,940	261,720
1885	794,173.80	158,187	2,095	16	0	0	190	8	107,626	266,813
1886	1,015,433.10	197,544	4,802	2	0	0	.....		294,485	492,029
1887	177,307.75	32,458	12,529	3	2	0	.....		541,952	574,410
1888	375,063.70	66,668	11,739	7	0	0	18,102	5	1,075,737	a1,142,405
1889	416,895.35	72,001	46,965	9	0	0	34,579	17	1,899,197	1,971,198
1890	496,552.80	95,410	89,719	15	0	0	41,319	18	2,667,144	2,762,554
1891	729,590.05	134,850	92,383	11	0	0	55,396	3	3,484,739	3,619,589
1892	350,061.50	56,884	87,504	15	0	0	45,850	4	2,420,952	2,477,836
1893	531,972.00	78,181	155,859	1	0	0	58,401	3	2,953,589	3,031,720
1894	846,822.00	94,150	137,813	8	0	0	42,513	2	2,195,339	2,289,489
Total	6,670,594.62	1,210,980	650,919	14	3	7	296,353	0	17,890,160	19,101,140

a In the Annual Report for 1888, 11,739 tons 7 hundredweight of silver ore, valued at £164,620, was omitted from the table. The bulk of the silver is exported in the form of silver-lead.

The following information in connection with the silver-mining industry in New South Wales is taken from reports forwarded to the Department by the Wardens and Mining Registrars:

THE ALBERT MINING DISTRICT.

Broken Hill Division.

Owing to the continued low price of silver, rendering the small outside mines unprofitable, work during the year has been almost entirely confined to the principal mines in Broken Hill, viz, the Broken Hill Proprietary, the Broken Hill Junction, British Block 14, Block 10, The Central Broken Hill South, and the Consols mine. The Broken Hill Proprietary Company employ no less than 3,352 men, including the managerial staff, and their mining and metallurgical plant is valued at £505,718. During the past year the company raised 642,822 tons of ore, which was estimated

[1] Annual Report of the Department of Mines and Agriculture, New South Wales, 1894, page 48.

to contain gold, silver, lead, and copper to the value of £2,167,635; the exact value of the gold saved from the silver bullion being £16,300.

The total quantity and value of the minerals exported from the field during the year were as follows:

	Quantity.	Value
Silver-lead bullion.....tons..	42,509	£1,543,638
Silver-lead ore.....do....	137,385	644,896
Silver ingots (pure).....ounces..	511,090	61,194
Copper ore.....tons..	80	672
Copper matte.....do....	190	500
Iron ore.....do....	254	256
Tin ore.....do....	25	1,172
Total.....	.....	2,251,729

As the bulk of the silver is exported in the form of silver-lead bullion, the exact quantity of pure silver can not be ascertained until the product is realized in London, but it may be set down as close upon 12,000,000 ounces.

Prospecting work was carried on by the Associated Companies during the year from the 1,330-foot level in the New Broken Hill Extended Company's shaft, but nothing of any importance was discovered. The total number of men employed on the field is 4,240, and the population of the town of Broken Hill is estimated at 20,000 souls.

THE BATHURST MINING DISTRICT.

Mitchell division.

The Sunny Corner Silver Mining Company's mine is still being worked on tribute, and there were 20,752 tons of ore raised, producing 586 tons of argentiferous and auriferous copper matte, valued at £34,065. The silver mines at Back Creek, Rockley, are idle, and the Mount Costigan and Cordillera in the Tuena district are practically idle.

MUDGEE MINING DISTRICT.

Denison Town division.

The Mount Stewart silver mine, which has been shut down for the last eighteen months, was worked on tribute during the last two months of the year, when a considerable amount of ore was smelted, but the returns were not available.

NEW ENGLAND MINING DISTRICT.

Fairfield division.

The White Rock silver mine resumed work during the year under the management of Mr. John Rossiter, who, in conjunction with Mr. J. W. Horton, has been engaged for some time experimenting with a view to find the cheapest and best mode of treating the low-grade ores. The system of treatment likely to be adopted is the chlorodising and amalgamation process, and the furnace to be used for the purpose of roasting will be Howell's patent, as also Howell's pans for amalgamation. The value of the plant on this mine is estimated to be £25,000.

Emmaville division.

Webb's and Mount Galena were the only two silver mines at work in this division during the year. At the former mine operations were energetically carried on, and 2,000 tons of concentrates were sent away for treatment, returning 48,000 ounces of silver, valued at £5,700, but it is questionable if at the present price of silver the

mine does much more than clear expenses. The tributors at Mount Galena raised 50 tons of ore, averaging 46 ounces of silver and 60 per cent of lead, valued at £550. The lodes at Mount Galena are wide and easily worked, and it is thought they should pay well if capital and energy were expended on them.

Wilson's Downfall division.

There has been a falling off in the silver-mining industry in this division, the mines at Rivertree being practically idle during the past year, the quantity of ore produced being only 70 tons, valued at £686. The Proprietary Company are still carrying out experiments in connection with the treatment of their ore. On the Proprietary Company's property only one lode has been worked, and that during the last few months of the year. A new shaft has been sunk to a depth of 70 feet on a lode from 5 to 8 feet thick, and averaging 20 ounces silver per ton. The owners of the Central mine have been developing their property during the year, and a few parcels of ore have been sent to the Queensland Company's works at Aldershot, which yielded 150 ounces to 200 ounces silver per ton. Work has been carried on by Reid and party on the amalgamated blocks with fairly good results, a parcel of 20 tons of their ore giving 225 ounces and another of 40 tons 100 ounces silver per ton.

SOUTHERN MINING DISTRICT.

Captain's Flat division.

The New Koh-i-noor and Lake George Gold and Silver Mining companies were amalgamated during the year. The quantity of silver saved by them was 40,701 ounces, valued at £4,823, as also 1,226 ounces of gold and 155 tons of copper. The united companies employ 200 men in connection with their mining and metallurgical works.

The work of development is being rapidly pushed forward, and the output of ore will, it is expected, be largely increased during the coming year.

Broken Hill Proprietary Company, Limited, Barrier Ranges Silver Field, New South Wales.

The following statement shows the tonnage of bullion treated in the refineries of the company, with results obtained:

[From "Reports and statements of account of the Broken Hill Proprietary Company, Limited," for half year ending November 30, 1895, p. 9.]

Half year ending—	Bullion treated.	Production.		Cost per ton of bullion.
		Fine silver.	Gold.	
	Tons.	*Ounces.*	*Ounces.*	£. s. d.
May 31 and November 30, 1890	7,154	1,762,116	463	2 4 5½
May 31, 1891	3,989	642,604	365½	2 0 9
November 30, 1891	2,796	821,928	440	2 14 7½
May 31, 1892	7,969	1,684,210	1,352½	1 14 6½
November 30, 1892	3,725	729,825	473½	1 19 3
May 31, 1893	10,994	2,857,722	1,848	1 8 2½
November 30, 1893	11,309	3,154,233	1,431½	1 12 1½
May 31, 1894	10,117	3,083,014	1,341½	1 9 3½
November 30, 1894	11,070	3,667,555	2,737½	1 8 8½
May 31, 1895	11,687	3,773,539	2,914½	1 9 0½
November 30, 1895	12,986	3,864,362	2,287½	1 4 6½

The construction of the Dore bullion parting plant is now well forward, and the general manager anticipates that it will be completed during the ensuing six months.

TOTALS OF REPORTED YIELDS FOR EACH HALF-YEAR FROM COMMENCEMENT OF THE COMPANY TO NOVEMBER 28, 1895.

[From Reports and Statements of Accounts of the Broken Hill Proprietary Company, Limited, for half-year ending November 30, 1895, p. 28.]

	Ore treated, net (including fine dust).	Bullion obtained.	Fine silver.	Lead.
Half-year ending—	*Tons. cwt. qr. lb.*	*Tons. cwt. qr. lb.*	*Ounces.*	*Tons. cwt. qr. lb.*
Nov. 25, 1886.....	10,397 0 2 0	2,107 11 3 0	871,665	1,990 17 3 0
June 2, 1887.....	18,410 16 3 0	2,861 12 3 0	835,526	2,836 7 1 0
Dec. 1, 1887.....	23,799 18 0 25	6,550 9 2 17	1,267,699	6,511 13 3 11
May 31, 1888.....	39,789 8 3 26	6,823 19 3 5	1,633,737	6,773 19 2 15
Nov. 30, 1888.....	54,336 0 2 6	9,955 12 3 23	2,290,455	9,885 10 2 23
May 31, 1889.....	68,545 4 2 13	11,499 9 2 18	2,677,686	11,417 10 0 12
Nov. 30, 1889.....	73,424 14 2 20	13,761 0 0 19	3,325,613	13,659 4 0 15
May 31, 1890.....	81,600 18 2 14	15,516 10 0 7	3,814,486	15,399 14 2 27
Nov. 30, 1890.....	87,819 9 3 22	15,051 12 3 17	3,697,196	14,988 19 0 22
May 31, 1891.....	129,233 12 1 0	23,771 9 0 4	4,796,342	23,624 12 1 19
Dec. 3, 1891.....	123,583 13 2 4	17,299 10 2 1	4,841,650	17,160 15 0 7
June 2, 1892.....	148,386 5 2 15	24,088 16 0 22	5,048,454	23,932 5 0 27
Dec. 1, 1892.....	62,568 2 3 20	9,039 18 1 6	2,120,523	8,975 11 1 18
June 1, 1893.....	196,274 14 2 9	21,860 11 0 10	5,894,962	21,690 0 1 19
Nov. 30, 1893.....	232,623 8 1 14	25,800 0 0 11	6,553,232	25,609 7 3 22
May 31, 1894.....	260,154 9 2 15	25,848 5 1 1	7,287,337	25,638 14 3 14
Nov. 29, 1894.....	311,462 2 1 3	24,144 4 0 7	6,767,056	23,955 12 3 12
May 30, 1895.....	267,358 17 0 2	19,526 3 0 6	6,233,720	19,358 17 0 13
Nov. 28, 1895.....	205,619 7 0 27	13,830 0 2 13	4,158,551	13,711 10 3 25
Silver obtained from ore treated at foreign reduction works.....	.....	.....	180,209	.....
Gross total.....	2,400,388 6 1 11	289,336 17 3 19	74,276,099	287,061 5 2 13

PARTICULARS OF GOLD MINING IN NEW ZEALAND IN 1894.[1]

Gold mining.

Notwithstanding the decrease in the yield of gold in 1894 the present state of the mines shows that the gold-mining industry is likely in the future to be greatly extended. The large demand for New Zealand mines as an investment for foreign capital is the means whereby properties, in which mining operations have for several years been suspended, owing to the want of money to develop them, can be again taken up. Fresh ground is also being applied for to carry on more extensive prospecting operations than hitherto, and money is forthcoming to assist to a far greater extent than heretofore in developing our mineral resources. Every encouragement will be afforded those who wish to invest their capital in mining ventures to carry on their operations in a bona fide manner: but, at the same time, safeguards will be provided to prevent large areas of mineral lands being held for purely speculative purposes.

The recent discoveries of auriferous lodes in the Reefton district at deeper levels than hitherto worked have given an impulse to mining in that locality, as these discoveries have demonstrated the fact that new lodes containing ore of a payable character for working will be found at great depths to take the place of the lodes carried down from the surface but which have cut out. Many mines which have been given up as valueless will now be tested to far greater depths than heretofore, and by judicious management they will yet be made to yield returns which, I feel confident, will fully recompense the owners for their outlay.

[1] *From Papers* and Reports relating to Minerals and Mining. Wellington, 1895.

The quantity of gold entered for exportation through the customs for the year ending March 31, 1894, as shown in Table No. 2 annexed, was 222,981 ounces, representing a value of £889,545, while the quantity exported for the same period of the previous year was 240,702 ounces, valued at £970,220. This shows a decrease last year of 17,721 ounces, but this does not in reality show the total production, as there is a certain quantity of gold manufactured into jewelry in the colony. Of the quantity exported, Auckland contributed 58,029 ounces; Marlborough, 1,911 ounces; Nelson, 1,633 ounces; West Coast, 85,015 ounces, and Otago, 76,393 ounces. The only district in which there was an increase was Auckland, the export being 5,603 ounces more than for the previous year, while in other districts the decreases were as follows: Marlborough, 351 ounces; Nelson, 546 ounces; West Coast, 13,915 ounces, and Otago, 8,512 ounces. Of the total quantity exported last year Auckland contributed 26.02 per cent; Marlborough, 0.89 per cent; Nelson, 0.73 per cent; West Coast, 38.13 per cent, and Otago, 34.27 per cent.

Earnings of the gold miners.

If we estimate the earnings of the men employed in gold mining on the same basis of computation as adopted in former years, namely, the value of the gold entered for exportation divided by the number of miners on the different gold fields as returned by the Mining Registrars, we can but approximately reckon the net receipts of the men. The cost of tools and interest on the value of the plant must also be taken into consideration, but as this can not be ascertained the average value of gold for each man employed must be adopted.

The total number of men employed last year was 11,412, as against 11,553 for the former year—a decrease of 141. The decrease was principally in the Westland district, where the number was 613 less than for the previous year. In Otago, also, there was a decrease of 59. In all other districts there has been an increase in the number employed, especially in the Auckland district, where 461 more men were employed than for the previous year. If we divide the value of the gold entered for exportation by the number of men employed in connection with the gold workings last year we get an average of £77 18s. 11d., as against £83 19s. 7d. for the previous year—a decrease of £6 0s. 8d. If the value of the gold in the different districts be taken and the number of men employed in each, it will be seen there was £127 1s. obtained for each miner in the Auckland district, £30 2s. 10d. in Marlborough, £30 2s. 10d. in Nelson, £72 1s. 1d. on the West Coast, and £69 5s. 2d. in Otago. In some places, however, the miners do not depend upon gold mining alone for their living, as they hold land under the occupation system, or have small homesteads on freehold land, and employ portions of their time in cultivation, etc.

Quartz workings.

This branch of the gold-mining industry is steadily progressing, although the yield of gold from the whole of the mines last year is nearly the same as for the former year. There has been an increase in the North Island, while on the West Coast there has been a considerable decrease. During the last year 116,094 tons of quartz and tailings were treated in the Auckland district, which yielded 156,698 ounces bullion, representing an estimated value of £261,746, as against bullion to the value of £219,651 for the former year, an increase last year of £42,095. In Marlborough only 25 tons of quartz and tailings were treated for a yield of 14 ounces gold, having a value of about £54 12s. In Nelson 3,554 tons of quartz were crushed, yielding 657 ounces gold, valued at about £2,562. On the west coast 38,370 tons of quartz and tailings were treated, which yielded 18,360 ounces gold, representing an approximate value of £71,604; and in Otago 13,390 tons of quartz and tailings were treated for a return of 5,713¼ ounces gold, having an estimated value of £22,283. The greatest decrease in the yield of gold from quartz workings last year was from the mines on the West Coast. It amounted to 10,193¼ ounces gold, having an approximate value of

£42,610. The total quantity of quartz crushed and tailings treated last year was 171,433 tons, which yielded gold and bullion to the value of about £358,250, as against £359,490 for the previous year. The yield last year from the quartz workings was equal to 40 per cent of the total value of the gold entered for exportation.

It may be interesting to honorable members for me to state that 52 per cent of the total value of the gold and bullion obtained in the North Island last year was extracted by the cyanide process. This is said to give about 26 per cent more of the gold in the ore and about 17 per cent more of the silver at the Waihi Company's works than was obtained previously by the most approved systems of amalgamation. Considerable advances have been made in the cyanide treatment since it was first introduced, and no doubt by further experiments the processes will be greatly improved in future. It, however, requires men specially trained to use the cyanide process successfully, as they must have a knowledge of the chemistry of minerals as well as understand the action of alkaline and acid substances on the ore under treatment, and the percentage of the solvent required to give the best results on the different classes of ore.

Coromandel.

Owing to a discovery of very rich ore in the Hauraki Company's ground, which formerly belonged to the Coromandel Company, there has been a great demand for mining properties in this locality, and considerable areas of ground have been purchased by English companies, who are providing money to develop their claims. The discovery of this rich auriferous ore was made by Ross and party, who were working on the tribute system, and who, while constructing an adit-level to their section of the ground, struck a very rich lode outside the portion of the ground they held, and which belonged to other tributers—Legge and party—who had done no work on their section. Between the beginning of May last year and the 2d of January of the present year Legge and party got 3,955 ounces of gold, representing a value of about £11,929, and since the company took the ground over from them to the 24th of August last 694 tons of stone, yielding 15,935 ounces of gold, were obtained, equal to about 22 ounces 19 pennyweights 5 grains of gold to the ton. This discovery has led to the taking up of a great deal of ground where very little work has been done for many years and to the commencement of active operations there. A large amount of prospecting has been done in the Kapanga mine, which also belongs to an English company, and recently the returns show a marked improvement. The property known as "Scotty's," as well as the ground on the Tokatea Range, have been purchased by English companies and are now being worked.

Some of the mines at Kuaotunu give promising returns, as, for instance, the Kapai-Vermont, and this will tend to cause more attention to be given to this field.

During the first year 9,936 tons of quartz and 6,158 tons of tailings were crushed, which yielded 22,632 ounces of gold, representing a value of £62,996, while 265 men were employed in connection with the mines.

Thames.

There has been a considerable falling off in the yield of gold from this field during the last year. This, however, was fully anticipated, the working in the principal mines being confined to within 500 feet of the surface, below which no prospecting operations can be carried on until more powerful and economical pumping machinery is erected and a shaft sunk below the depth of the present level. The upper levels having been worked and well prospected, there is little hope of striking any large bodies of auriferous stone until a greater depth has been reached. On the other hand, the rich discoveries of auriferous lodes in the Ohinemuri district have attracted the attention of mining men, and this being a comparatively new field offers a larger scope for carrying on prospecting operations than the Thames field at the present time. A company with a considerable capital has, I am glad to state, been floated *in London to provide* a powerful drainage plant to drain the water at the Thames to

a depth of 2,000 feet, which will admit of the field being opened out afresh. Where so large a quantity of gold has already been obtained there is a fair probability of rich discoveries being made at deeper levels than hitherto worked; at least, this has been the experience on every other gold field where rich stone was obtained at shallow depths.

During the past year 25,971 tons of quartz and 11,938 tons of mullock were crushed, which yielded 20,865 ounces of gold, and 10,555 tons of tailings were treated for a return of 1,945 ounces of gold, representing an estimated value of £59,340, while 598 men have been employed in the mines.

Ohinemuri.

This gold field promises to be one of wide extent, and the yield of bullion is steadily increasing. A number of large lodes are known to exist, containing both gold and silver, and comparatively little prospecting has yet been done on any of them, with the exception of that carried on in the immediate vicinity of Karangahake, Waitekauri, and Waihi. The great bodies of auriferous and argentiferous ore found at the latter place, which get richer as the depth of the workings increase, gives a value to the Waihi Company's property at the present time of about £1,000,000. The large body of payable ore in this company's mine and the steady returns of gold obtained have attracted capitalists' attention to this locality, and a number of special claims have recently been taken up with a view of carrying on extensive prospecting operations in other parts of the field. The demand for mining properties where considerable sums of money are required as a working capital is greater at the present time than ever it has been since the gold fields have been opened.

The discoveries at the Golden Cross, Waitekauri, have also given an impetus to mining in this locality. The large auriferous and argentiferous lodes containing rich ore mark this as a place where considerable sums of money will be expended in prospecting for other lodes, and also where a large mining population will find profitable employment.

During the past year 31,221 tons of quartz were crushed, which yielded by amalgamation 16,572 ounces, and by the cyanide process 76,360 ounces of bullion, while 19,837 tons of tailings were also treated for a return of 17,665 ounces, and 31 ounces of bullion by amalgamation, making a total of 110,628 ounces of bullion, representing an estimated value of £137,699, which is equal to about £1 3s. 1d. per ounce, as against 68,603 ounces of bullion, having a value of £107,001, for the former year, which is equal to about £1 11s. 2d. per ounce, while 538 men have been employed in connection with the mines last year. The recent discoveries last year and the good returns from the mines have given a considerable impulse to mining in the adjacent districts, causing extensive areas to be again taken up. It has therefore been considered advisable to extend the boundaries of the gold fields in the Hauraki district.

Waiorongomai.

Very little mining has been carried on during the last year on this field, notwithstanding the numerous lodes that are known to exist containing both gold and silver, and which have to a certain extent been proved to contain sufficient bullion to make them remunerative for working if a suitable process were adopted to extract the bullion from the base metals in the ore. Rich patches of auriferous ore have been obtained from the main line of reef traversing the country and outcropping for some miles along the range. But this main lode has never been tested at any great depth, although this could easily be done by adit-levels.

During the last year only about 16 men were employed on the field, and 891 tons of quartz crushed, which yielded 572 ounces of bullion, while 250 tons of tailings were treated for a return of 55 ounces of bullion, representing a value of £1,711.

West Coast.

The principal quartz district of the West Coast is the Inangahua, but unfortunately there has been depression in mining there for some years past. It is, however, gratifying to state that this cloud of depression is likely to be lifted, and things are assuming brighter aspects than they have done for some time past. Many of the mines have been worked to a considerable depth; but until last year nothing was found of any consequence to afford encouragement to prospect the lodes at deep levels. The lodes that had been worked from the surface were found in some of the mines to get broken up and cut out, and, even when they were found to continue to go down, the ore became of too low a grade to prove remunerative for working. This being the case, those who were interested in mining properties became disheartened at paying calls without any likelihood of being again recouped for the outlay.

This state of things existed last year, when a new lode was discovered in the Keep-It-Dark mine, at a depth of about 770 feet below the surface, near where the lode on the upper levels cuts out. After sinking on this new lode for 100 feet, it was proved to be of a considerable size, from 10 feet to 12 feet in width, and the crushings recently made from this place show the yield to be from 10 pennyweights to 15 pennyweights of gold per ton; also on the adjoining mine, the Wealth of Nations, a new lode has been found at a greater depth than hitherto worked, and promises to give good returns. These discoveries have been the means of directing more attention to quartz mining on this field, and properties are being again taken up which before were considered of little or no value.

There has recently been a considerable demand for mines in the Reefton district. A Mr. Ziman, from South Africa, has lately purchased several mining properties with the view of finding sufficient working capital to open them up at greater depths and to carry on far more extensive operations than heretofore.

At the Lyell an auriferous lode has been cut in the low-level tunnel constructed by the Lyell Creek Extended Company at deeper levels than heretofore worked, which promises to give fair returns for a time. In the Grey district, at Langdons, a lode has been discovered from which exceedingly rich ore has been obtained, but sufficient work has not yet been done to ascertain the extent of this shoot of gold-bearing stone. These recent discoveries have given more confidence to men to invest money in opening out the mines on a more extensive scale than heretofore and to carry on prospecting operations at deeper levels.

During last year there were 41,947 tons of quartz crushed on the west coast, which yielded 190,315 ounces of gold, representing a value of £75,301, while about 414 men were employed in connection with the mines.

Otago.

Although there has been a large quantity of alluvial gold found at Otago, this part of the colony has never been to any extent a quartz-reefing district. The richest lode yet opened up is in the Cromwell Company's mine at New Bendigo, from which it is stated about £400,000 has been paid in dividends. Notwithstanding this rich find, very little work has been done in this mine for many years past, with the exception of taking out some of the blocks of stone left in the early days—stone at that time considered of too low grade to pay for working.

The quartz workings at Skippers and Macetown are the oldest in Otago, but the mines there have not yielded a very large quantity of gold. Indeed, it is questionable if ever the mines in these localities have yielded in the aggregate as much gold as the Cromwell mine at New Bendigo. Comparatively little gold is obtained from any quartz workings in other parts of the Otago district.

Great expectations were at one time formed of the gold-bearing qualities of the *quartz* reefs in the vicinity of Wilsons River, near Preservation Inlet, but these

expectations have not yet been realized to any extent. The Golden Site mine, in which very rich stone was obtained near the north side of Wilsons River, has not been proved to run for any great length. This district is, however, very little prospected, and several fresh discoveries have been made during the past year which tend to show that both in the alluvial drifts and in the quartz lodes gold will be found remunerative for working when the country is properly opened up.

During the last year 13,390 tons of quartz and tailings were crushed and treated, which yielded 5,713½ ounces of gold, representing a value of £22,283, as against a value of £22,015 for the former year, and there were about 355 men employed in connection with the quartz workings.

Summary of the quartz workings.

Taking the whole of the quartz workings in the colony, it will be found that there were 171,433 tons of quartz crushed and tailings treated last year, which yielded 181,442½ ounces of gold and bullion, representing a value of £358,250, while 2,191 men were employed in connection with quartz workings.

Alluvial mining.

The alluvial gold workings still continue to supply about 60 per cent of the gold obtained in the colony. This class of mining is entirely confined to the Middle Island, as only a small quantity (about 67 ounces) came last year from Stewart Island. The immense areas of ground covered with auriferous gravels, both on the west coast and Otago, show that the largest percentage of the gold produced will be derived from the alluvial workings for many years to come. The extent to which these workings can be carried on is only limited by the quantity of water that can be obtained to command the ground. It is only in a few localities where the wash drift is sufficiently rich to pay for mining in the strict sense of the term—that is, by working from shafts and adit levels. The principal workings are carried on by hydraulic sluicing and elevating. During recent years, also, much of the gold has been got by using dredging machines.

The auriferous gravels are divided into five different classes, namely, the recent and more modern deposits; the elder gravels found on the west coast belonging to the Upper Miocene or Lower Pliocene periods; the still older quartz drifts found in Otago from the denudation of the Silurian quartz-schistz formation which covers so large an area in that district; the more concentrated gravel drifts found in the beds of rivers from the different formations; and the sea-beach leads along the coast line, together with those formed at the higher levels on the west coast. All these may be designated littoral, fluvatile, and lacustrine deposits.

The great factor for carrying on alluvial mining operations of every description is water. Not only is this essential for hydraulic sluicing operations, but it is also required as a motive power for working, pumping, winding, and dredging machinery. Wherever water can be utilized as a motive power it lessens the cost of mining and enables men to work ground remuneratively which could not be done if steam had to be used, unless the operations were close to a coal mine where fuel could be obtained at a cheap rate.

The mining districts in Otago being principally in the interior, where the rainfall is considerably less than elsewhere in the colony, extensive water races and reservoirs, although they may cost a considerable sum to construct in the first instance, will be a valuable asset, as when they are not required for mining purposes they can be fully utilized for irrigation, and greatly enhance the value of both agricultural and pastoral land.

Provision was made by legislation last year to afford encouragement to those interested in mining to construct large water supplies, so as to extend the scope of carrying on hydraulic sluicing operations, but so far only two applications have been made for subsidies under the regulations for the construction of water races having

a carrying capacity of over twenty sluice heads. Inquiries are now being instituted as to collateral advantages to be derived by the proposals submitted.

In order to allow hydraulic sluicing operations to be carried on it was found necessary to proclaim several streams as water courses into which tailings, mining débris, and waste water from mining claims may be allowed to be discharged, and for the past year and up to the end of July last £2,982 has been paid as compensation to the owners of land alienated since 1886. The question of any further proclamations will have to be carefully considered, as the claims for compensation in many instances amount to large sums of money.

MARLBOROUGH.

The alluvial workings in this district are situated in the Wairau Valley, Wakamarina, and at Mahakipawa. There are, however, only a limited number of men engaged in mining at these places. At Wakamarina another attempt is being made to work the gorge near the junction of Deep Creek with the river, where several companies, after spending a good many thousand pounds, have failed. It is to be hoped that the present company will benefit by the experience of their predecessors and take better precautions against the floods which heretofore have prevented the bed of the gorge being worked.

At Mahakipawa there are still a number of men employed in mining, although many less than there were two years ago. Rich auriferous wash drift has been obtained in the King Solomon mine, on Mr. Cullen's freehold, and the same run of gold is likely to be traced farther down the flat. The difficulty experienced is the quantity of water, which requires good-sized pumping machinery to overcome it.

The total number of miners employed in the Marlborough district last year was 253.

West Coast.

The alluvial workings on the West Coast extend from Collinwood to Jacksons Bay and include mining in the proper sense of the term, namely, sinking and driving as well as hydraulic sluicing and dredging. The latter branch of mining is only yet in its infancy on the West Coast. Although a great many dredges have been placed on the ocean beaches to lift and treat the auriferous sand, they have so far not proved a success, owing to the washing appliances being defective for the character of gold found; but where dredges have been placed on river beds to deal with the concentrated material from the recent and more modern gravels, these machines have proved satisfactory.

Upper Buller.

There is a considerable population engaged in mining between the junction of the Inangahua and Buller rivers and the head of Matakitaki Valley, where the workings are carried on along the banks and terraces fronting the Buller River, and also in the valleys of the Matakitaki and Glenroy rivers. At the upper Matakitaki there is a great depth of auriferous wash drifts on many of the terraces, and during the last year the Mammoth Company has expended a considerable amount of money in bringing in a water supply to work these drifts by hydraulic sluicing. From the trial tests recently made a large quantity of ground is likely to be found that will pay for working in this manner.

Higher up than where these auriferous gravels are deposited is a very large area of country covered with quartz conglomerate resembling, to a large extent, that now being worked for gold in South Africa. These conglomerates extend from the Mangles to near the Maruia River. Some parcels have been tested at Reefton from this formation and as high as 5 pennyweights of gold to the ton have been obtained, but the area covered with these conglomerates is so large that it would take a considerable time to prospect the deposit unless by mere chance a rich lead was met with. There is, however, an indication that a field will be opened up in this locality *where quartz*-crushing machinery will be largely employed.

Westport, Addison's, and Charleston.

There are a considerable number of miners working north of Westport on the North Beach, North Terrace, and in the bed of the Waimangaroa River. Several nuggets have been recently found at the Waimangaroa, which led to a number of mining claims being taken up.

On the south of the Buller River there are about twenty men engaged in hydraulic sluicing at Bradshaw's Terrace; and there is a considerable mining population at Addison's, and also at Charleston. Addisons Flat comprises a large pakihi, having several leads of gold-bearing gravels running through it parallel with the ocean beach. There are a considerable number of mining claims on this flat which give remunerative returns for working, and more of the ground would be taken up if a further supply of water could be procured at a reasonable cost, the whole of the water from the local creeks and rivers being at present utilized.

At Charleston the workings are principally on old sea-beach deposits. Large areas are covered with a dark-brown sand, cemented firmly together with oxide of iron, which requires crushing machinery to liberate the gold which the sand contains. Several parties are also carrying on hydraulic sluicing operations, while others are engaged in washing the sand on the ocean beach and making a comfortable livelihood. About 282 men are engaged in mining in the Westport district.

Grey Valley.

The whole of the country in the vicinity of the Grey Valley is more or less auriferous, and some very rich deposits of auriferous gravels have been and are still being worked on the south side of the valley, where there is almost an unbroken line of the old gravels extending from the Inangahua River to Maori Creek. In every gully and creek bed cutting into these gravels rich auriferous deposits have been found, and in many places bands and layers of these gravels have given good returns for driving out from shafts and adit-levels. In many of the wide valleys, where the auriferous layer has not a great depth of superincumbent material above it, the ground is worked by paddocking.

Slab Hut, Antonio's Blackwater, Snowy, Waipuna, Duffer's, Half Ounce, Orwell, Callaghan Nelson, Red Jacks, and No Town creeks, with their various tributaries, have been and are yet the receptacle of rich auriferous concentrated material, which will afford employment to a large mining population for many years to come, while the wash drift on the whole of the high terrace land along this line will give remunerative wages with a liberal supply of water with which to work it.

The ground on the north side of the Grey Valley is of a more recent formation, but still there are a number of good claims in the localities of Moonlight and Blackball, where many men are averaging higher wages than anywhere else on the west coast.

Westland.

This embraces a large field and one where no less than 2,448 men were employed in connection with mining during the past year. It includes the portion of the west coast from the Grey and Arnold rivers to Jackson's Bay. It was in this district that gold was first discovered on the west coast by a party of Maoris on one of their periodical visits to Greenstone Creek in search of the pounamu stone, so highly prized among them for making weapons of defense and ornaments.

Kumara.

The largest center of the alluvial mining population is at Kumara, where a large quantity of gold has been obtained from a comparatively small area of ground. This is still a place capable of supporting a considerable population. The leads of auriferous drifts are some distance back from the Teramakau River. This makes

needful the construction of long tailraces to convey the tailings from the mining claims to the bed of the river. Five of these long tailraces have been completed and a sixth is now being commenced, which will be about 70 chains in length. Where works of such magnitude have to be constructed, with boxes and false bottom blocks, subsidies have been given toward their cost.

The revenue from the Government water race, which supplies most of the mines on the Kumara field, is dependent on the number of claims that can utilize the water; hence the necessity for giving assistance toward opening up new ground.

Callaghan's, Waimea, and Stafford.

At Callaghan's, Waimea, and Stafford men continue to get a livelihood working in the terraces. At Callaghans a good deal of new ground will shortly be opened up—as soon as a branch water race, which is now in course of construction, is completed; and at Waimea a long tailrace is in course of construction, to enable new ground in the middle branch and the upper portion of Waimea Flat to be worked by hydraulic sluicing. Between Waimea and Stafford men are only making small wages, owing to the distance at which the workings are located from the creek bed, which is the only place for the deposit of tailings. Then, the small amount of fall for the sluices, together with the fact that the ground is gradually deeper as it gets into the range, prevents the same amount of bed rock from being laid bare as in former years, and consequently there is a large decrease in the yield of gold.

Humphrey's Gulley.

At Humphrey's Gully there is a large area of ground covered with auriferous gravels, which in some places are 300 feet in depth, with plenty of fall. The whole of them may be worked by hydraulic sluicing. A company has been working these gravels for the last seven years with a small supply of water, and gold to the value of about £30,000 has been obtained, but the quantity of water at the command of the company is totally inadequate to work this large deposit on anything like an extensive scale. Recently arrangements have been made for additional capital to extend the company's water-race to the Arahura River, where practically an unlimited supply will be obtained.

Blue Spur.

At the Blue Spur extraordinarily rich ground has been opened up during the last year, the wash drift containing nearly 3 ounces of gold to a load. This discovery is due to Mr. Augustus Boys, who, by indomitable perseverance, constructed a drainage tunnel for nearly a mile in length to test the ground, he having been seven years in completing the tunnel, and now he is likely to be well rewarded for his outlay. Not only has Mr. Boys got on to rich gold-bearing wash drift but other claims adjoining him have found the same lead going through their ground. About 40 acres of this ground were applied for as a freehold by Mr. Dwyer, but arrangements have been completed for resuming possession of this ground in order to throw it open for mining.

Kanieri and Rimu.

The Kanieri diggings are getting pretty well worked out near the township; still there is a considerable population engaged in mining in the district, scattered about in the different gullies. Workings are carried on at the Kanieri Forks, Gentle Annie, and other places near the branches; while at Woodstock, Back Creek, Rimu, and Seddon's Terrace there is a large population employed, some working from shafts and adit-levels and others, who have small supplies of water, carrying on hydraulic sluicing operations.

There is a great depth of alluvial-drifts in the vicinity of Back Creek and Seddon's Terrace, with different bands or layers containing gold, but all these layers are *lying on a false* bottom. In no place has the main bottom in this locality been

reached. How far back these gold-bearing layers will be found has not yet been determined; but the best of the ground, that is, the richest of the layers of auriferous bands, does not extend for a long distance back from the face of the terrace fronting the Hokitika River.

Ross.

This is a place where it is known that a rich lead of gold exists in the flat; but being below water level it requires very powerful machinery to drain the ground, which has been lying for many years without anything being done to work it. The best gold-bearing layer on this flat is about 240 feet under sea level, and is a fluviatile deposit, with gravels and stones highly rounded, and of the same soft brown formation as the "Old Man" bottom, of which the lead on Ross Flat is only a concentration. This lead has been partially worked to near the foot of German Gully; but there is a probability that a rich gold-bearing layer will be found further on toward Donohue's, near the foot of Sailor's and Swiper's gullies.

No workings can be carried on here unless provision is made to prevent the water from Jones Creek getting down into the lower workings, and the quantity of water in that creek in time of floods is more than ordinary pumping machinery could cope with. It is ground which can not be worked unless by a company with a large capital, as a considerable expenditure will have to be made to cut off all the water to prevent it reaching the flat, and a very large pumping plant will also be required to not only drain the water which is now accumulated in the old workings, but also to cope with the permanent inflow through the different layers of gravel. From what is known of this flat there is a considerable quantity of gold in the drifts, but a large sum of money will be required before the flat can be successfully worked.

The quantity of gold produced on the west coast last year, exclusive of that obtained in the Collingwood district, was 85,015 ounces, representing a value of £339,731. The total quantity produced to the 31st of March last was 5,517,080 ounces, having a value of £21,921,556.

Otago.

This is a field which has produced a large quantity of gold; and the workings in the early days being in shallow grounds with remarkably rich deposits of auriferous gravels, were the means of bringing New Zealand prominently before the world as a gold-producing country and of causing a rapid influx of population. Many of those who were first attracted to our shores have invested their earnings on the gold fields in the purchase of homesteads and have tended greatly in the permanent settlement of the lands of the colony.

Maerewhenua.

The number of miners employed in this district continue about the same as they have been for some years past. There is a large area covered with auriferous wash drift, but very little of it is sufficiently rich to pay for driving out, and the quantity of water that can be brought on to command the ground to work it on the hydraulic-sluicing principle at anything like a reasonable cost is very limited. The number of men, therefore, who can find profitable employment is controlled by the available water supply. During my visit to this district last year a deputation waited on me with the view of obtaining assistance toward bringing another water race on to the field from the Maerewhenua River, and I arranged to find the cost of wrought-iron pipes required for siphons to convey the water across some ravines, on condition that I was satisfied that the water race which was partially completed was capable of conveying a fair supply of water. But I have not received any further communication from the parties who were engaged in the work, and so am unaware whether their race has been completed in accordance with the conditions or not.

The number of men engaged in mining on this field last year was seventy-five, and the quantity of gold obtained was 1,822 ounces, representing a value of £7,488.

Mount Ida.

There are a fair number of men engaged in mining in this district, and some very rich ground has been worked, but the general average of the earnings of the miners is not large. The ground lies at so high an elevation as to preclude any mining for about two months during midwinter, when the ground is frozen, and the water in the race converted into ice.

At Naseby the miners are chiefly dependent on water from the Government water race to work their claims, and in last season, a particularly dry one, the supply of water was rather limited toward the end of the summer. The water supply at this elevation is controlled to a great extent by the quantity of snow that lies on the mountains during the winter months, and from the heavy falls of snow during this winter a good supply of water may be expected for the next season.

St. Bathan's and Vinegar Hill.

The St. Bathan's basin contains a large deposit of quartz-drift, in which there are several rich auriferous layers. Over 300 feet vertically of this drift has been washed away in some of the claims, giving large returns of gold, and, deep as the workings have been carried, the quantity of the gold in the drift does not seem to diminish. This line of quartz-drift seems to follow near the foot of the range, and it is said to be a lacustrine deposit, where the shores of the lake were encircled by the present range of mountains. It is near the old shore line where the rich deposits of gold-bearing drifts are found. The quartz-drifts are in stratified layers, having been greatly tilted since they were laid down, and faults are now found in this deposit, just as in solid rocks. These faults can be seen in Mr. Ewing's claim at Vinegar Hill, where the old lake deposit can be closely observed, containing as it does an immense quantity of the vertebræ of small fishes.

Before leaving St. Bathan's and Vinegar Hill, I can not speak too highly of the enterprising manner in which Mr. Ewing has carried on hydraulic-sluicing operations. The difficulties he has had to encounter time after time in opening out and working his claims, with all the modern appliances, are worthy of the highest commendation. It is only by close attention and adopting improved appliances that poor ground can be made remunerative working.

Tinker's.

The results of the gold-workings in this locality show it to be one of the richest places of recent years in Otago, and, although the gold returns are less than they were a few years ago, most of the claims where water is available continue to yield very good returns. A similar description of quartz-drift is met with here as at St. Bathans, with rich auriferous layers through it, but a good deal of the deposit at Tinker's can not be successfully worked on account of dipping under the toe of the range, with a great depth of loose material and heavy bowlders overlying it. Here there is but very little gold, and the limited fall in the tail races is not sufficient to convey away a large quantity of coarse wash-drift. This is a field where a considerable mining population will make a livelihood for many years.

Miners are working here and there in different places in the valley of the Manuherikiu River, and in many of its tributaries. Last year some ground was opened at Manorburn, where several claims were said to yield fair returns of gold.

Tuapeka.

It was in this district that gold was first discovered in Otago, and the rich finds in Gabriel's, Monro's, Wetherston's, and Waitahuna Gullies, all made within a few weeks of each other, induced thousands of people from other colonies to come to New *Zealand*. Even now, notwithstanding that thirty-four years have passed since these

places were opened, there are still a number of men obtaining their livelihood by gold-mining in close vicinity to the early workings. It is gratifying to state that the deposit at the head of Gabriel's Gully, where men have been employed since the first opening of the field, is still continuing to yield a fair profit. I refer to the Blue Spur, where the principal workings are carried on by a company formed with English capital, who got about 3,789 ounces gold for the year's work.

It is to be regretted that any dissensions have arisen between the miners at Waipori and the farmers holding land adjacent to the river in the vicinity of the township of Berwick. Each class is to a certain extent dependent on the other, for the miners require supplies from the farmers, who thus get a ready market for their produce. I trust that the differences at present existing will soon be settled amicably.

Through the whole of the Tuapeka district, which includes Waipori and the lower portion of the Clutha Valley, there were 600 men employed in carrying on mining operations last year, and 22,350 ounces of gold was obtained, representing a value of £90,180.

Clutha Valley.

There are several large companies carrying on mining operations in this valley, some by hydraulic sluicing and elevating and some by dredging. The whole of the drifts in the Clutha Valley are nothing but a deposit of concentrated material, the light sand and mud being carried away by the waters of the Clutha River to the ocean, and leaving the denser materials behind. This river has shifted its channel at different times, and gradually cut down its present bed, where very rich deposits of auriferous wash-drifts are found in many places. Indeed, there are few of the dredging-machines now placed in this river which are not working the bed with success.

Dredges, as applied to mining, have not only been profitably employed in lifting the auriferous gravel from the beds of rivers, but they are also used in working the ground in flats, when the depth does not exceed 35 feet, and where the quantity of water to contend with has hitherto prevented the ground being worked by any other means, and they are likely to be largely used in this way in the future.

The bed of every tributary and stream coming into the Clutha Valley contains more or less gold; and on the Old Man Range, fronting the valley, wherever there is any wash drift containing gold, men are to be found working at different places and making a livelihood whenever a supply of water can be obtained. A few people may still be found working at Bald Hill Flat, Butcher's and Conroy Gullies, although the ground in these localities has been turned over several times.

Cromwell.

Both on the banks of the Clutha and Kawarau Rivers there are men engaged in sluicing the wash-drifts; and, notwithstanding that Bannockburn is one of the oldest diggings in the locality, there are still a considerable number of miners employed, and a good deal of ground can yet be profitably worked if fall can be got for tailings. The available ground in the vicinity of the Pipeclay Gully Channel is getting yearly less, and the construction of another channel is contemplated to enable the bed and terraces alongside Smith Gully to be worked.

Cardrona and Criffel.

The number of miners and yield of gold from these places have varied very little for many years. As ground was worked out other discoveries were made, and by this means most of the miners have been kept in the locality. The most recent new discovery made is in the face of Criffel Range, where the gold is found in a very old deposit and in similar drift to the rich auriferous wash found a few years ago in Robertson Brothers' claim on the flat. The high elevation of this range does not permit sluicing to be carried on for some months in winter, but the miners at work

in this locality intend to drive an adit-level into the face of the range below the depth of the present workings to ascertain the value of the deposit where it joins the schist-rock. They can not do this in an open cutting, as the face of the range keeps slipping forward. The work done here during the last two seasons has proved the ground to be fit for hydraulic sluicing.

At Criffel only a few men were employed last year, the whole of the available water being held by one party. About 75 men are employed about Cardrona and Criffel, who obtained about 1,000 ounces gold during the past year.

Arrow and Shotover.

There are the same number of men working in these localities as there were during the previous year, but the yield of gold last year showed a decrease from that of the former year. There are, however, large deposits of alluvial drifts, and, where the auriferous wash is not overlain by a great depth of gravel, in which there is little or no gold, these drifts are made to pay very well for working on the hydraulic sluicing principle. The great factor in working these drifts is water, and, although we have large rivers, they can not, in many instances, be utilized, owing to the great cost of lifting the water and constructing water races; and, further, in many cases the water could not be lifted from some of the principal rivers so as to be carried at a sufficient elevation to command the ground to be worked. Many of the terraces contain great depths of auriferous gravels, which will take years to work with the present supply of water.

Mining works of considerable magnitude have been undertaken in these localities. Miller Brothers have gone to a large expenditure in the construction of works to work the bed of the Arrow River at the falls, and also in opening out claims on Pleasant and Stoney Creek terraces, while other large works are to be seen on the Upper Shotover, and also at the Sew Hoy Company's claims at Arthurs Point and the Big Beach.

Round Hill and Orepuki.

There are a number of men engaged in mining in the vicinity of Round Hill and Orepuki, and a fair quantity of gold is being obtained. Formerly there were very few Europeans as compared with the number of Chinese at work at Round Hill; but since an English company has commenced hydraulic sluicing and elevating the number of Europeans has considerably increased, while the number of Chinese has decreased. The ground in this locality must be very good to pay for working with the very small supplies of water available. Indeed, in many fields the quantity of water used would not enable men to procure sufficient gold to pay for their food. This English company referred to hold most of the water-rights in the place, but have not sufficient water to carry on their own mining operations on an extensive scale. They are getting enough gold, however, to pay for working the ground.

At Orepuki the workings are all on a seabeach deposit, and some of the men are doing fairly well. Adjacent to the gold-workings is a mining reserve which comprises very good land, and, between mining, keeping a few cattle, and working their gardens, the men seem to make a fair livelihood.

Preservation Inlet.

Gold has been got in a good many places in this locality—Wilson River, Coal Island, Crayfish Island, and on the mainland between Preservation and Chalky inlets. During the last year some prospecting parties were out in the ranges between Chalky Inlet and the head of Dusky Sound, but although gold was found in several places, it was not in sufficient quantities to pay for working. Very little, however, is known about this part of the country, and it has heretofore been looked on as a *terra incognita*. The rough and broken nature of the land, which is as yet unopened by tracks, together with the moist climate, have prevented prospecting being carried on for

any great distance back from the different bays of the inlets, where provisions and tools can be taken by boats.

The quantity of gold obtained from the gold fields of Otago last year was 76,393 ounces, having value of £308,070, while the total production since the field was opened was 5,130,985 ounces, representing a value of £20,283,482.

NEW ZEALAND.

TABLE SHOWING THE TOTAL QUANTITY AND VALUE OF GOLD ENTERED FOR DUTY FOR EXPORTATION FROM JANUARY 1, 1857, TO DECEMBER 31, 1894.

Year.	Total.		Year.	Total.	
	Ounces.	Value.		Ounces.	Value.
1857	10,437	£40,422	1877	371,685	£1,496,080
1858	13,534	52,464	1878	310,486	1,240,079
1859	7,336	28,427	1879	287,464	1,148,108
1860	4,538	17,585	1880	305,248	1,227,252
1861	194,031	751,873	1881	270,561	1,080,790
1862	410,862	1,591,389	1882	251,204	1,002,720
1863	628,450	2,431,723	1883	248,374	993,352
1864	480,171	1,856,837	1884	229,946	921,797
1865	574,574	2,226,474	1885	237,371	948,615
1866	735,376	2,844,517	1886	227,079	903,569
1867	686,905	2,698,862	1887	203,869	811,100
1868	637,474	2,504,326	1888	201,219	801,066
1869	614,281	2,362,995	1889	203,211	808,549
1870	544,880	2,157,585	1890	193,193	773,438
1871	730,029	2,787,520	1891	251,996	1,007,488
1872	445,370	1,731,261	1892	238,079	954,744
1873	505,337	1,987,425	1893	226,811	913,138
1874	376,388	1,505,331	1894	221,615	887,839
1875	355,322	1,407,770	Total	12,756,722	50,188,838
1876	322,016	1,284,328			

TABLE SHOWING THE TOTAL QUANTITY OF SILVER ORES (THE PRODUCT OF NEW ZEALAND MINES) EXPORTED FROM THE COLONY UP TO DECEMBER 31, 1894.

Year.	Silver.		Year.	Silver.	
	Ounces.	Value.		Ounces.	Value.
1869	11,063	£2,993	1883	16,826	£3,785
1870	37,123	11,380	1884	24,914	5,125
1871	80,272	23,145	1885	16,624	3,169
1872	37,064	9,910	1886	12,108	2,946
1873	36,187	9,850	1887	20,809	3,453
1874	40,566	10,380	1888	403	71
1875	29,085	7,569	1889	24,105	4,043
1876	12,683	3,171	1890	32,637	6,162
1877	33,893	7,556	1891	28,023	5,151
1878	23,019	5,755	1892	22,053	3,996
1879	20,645	4,512	1893	63,076	9,743
1880	20,005	4,500	1894	54,177	6,697
1881	18,885	4,236	Total	721,939	160,584
1882	5,694	1,286			

TABLE NO. 1.—COMPARISON IN QUANTITY AND VALUE OF GOLD AND SILVER ENTERED FOR EXPORTATION FOR THE YEARS ENDING DECEMBER 31, 1893 AND 1894, AS WELL AS THE TOTAL VALUE SINCE JANUARY, 1853.

Mineral.	For year ending December 31, 1894.		For year ending December 31, 1893.		Total from January 1, 1853, to December 31, 1894.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Ounces.		*Ounces.*		*Ounces.*	
Gold	221,615	£887,839	226,811	£913,138	12,756,722	£50,188,838
Silver	54,177	6,697	63,076	9,743	721,939	160,584
Total	275,792	894,536	289,887	922,881	13,478,661	50,349,422

Westralian Gold.[1]

We publish in our present issue a tabular return, from official sources, of the gold produced by the colony of Western Australia and entered for export from January 1, 1886, to December 31, 1895. This table shows the quantity and value—the value is taken at £3 16s. per ounce—from the respective gold fields. We believe this table will be extremely useful for reference, and suggest that our readers should preserve it for that purpose. The gold fields of Western Australia can say with the old song, "We are seven." We now name them in the order of their discovery: Kimberly, Pilbarra, Yilgarn, Ashburton, Murchison, Dundas, and Coolgardie. The latter was the last discovered, and it is the best. Kimberly was the first discovered, and it is far from being the best. It has, however, at least the credit of having produced gold continuously from 1886. It began with £1,147 in that year, and in the year following it made its record return of £18,517. It has continued to decline, until in 1894 the gold return was as low as £2,236, and only reached £3,331 in 1895. If we except the trifling production of the Ashburton and Yilgarn gold fields, Kimberly is the only one that has steadily declined. We must own to a feeling of disappointment with respect to the production of Yilgarn, which, commencing with £7,062 in 1889, rose to £287,829 in 1893, but fell last year to £75,044. The Ashburton gold field has never been thought much of.

It never produced more than £3,187, this being in 1891, and the following year the returns fell to the deplorable total of £2 13s. 2d.—we give the odd shillings and pence so as not to "minimize" the result. Last year, however, the production was £2,054. We must also confess to a feeling of disappointment with the Dundas production. Work was only commenced in 1893, and then the value of the gold produced was £562, but it only reached £919 last year. It is with pleasure we observe that the Pilbarra gold field has shown a decided tendency to an increasing yield of gold. It commenced in 1889 with a return of £42,446, and after sundry fluctuations it made its record return in 1895 of £74,185.

We are now left to deal with the gold production simply of Murchison and Coolgardie, and here the figures have been most satisfactory. Murchison began to produce gold in 1891. Its return then was £7,844, and the following year it was £92,554. In 1893 the returns fell to £80,599, but they rose with a bound to £201,196 in 1894 and to £248,813 in 1895.

The rate of increase is satisfactory. This money was the result of 166,054 ounces. For only two years—1894, 1895—has Coolgardie made gold returns, and they have been very satisfactory. In the former year they were of the value of £400,253 and in the second year £475,402. Coolgardie has so far distanced its six other competitors. Its total production for two years alone has been 230,435 ounces, of the value of £875,655, as compared with a production by the Murchison district for five years of 166,054 ounces, and a value of £631,008. Of course the comparison can only be made with certain limitations, for it may be contended that not so much capital has

[1] From the London Mining World of February 22, 1896.

been thrown into the Murchison district as has found its way to the Coolgardie leases, but still the public prefers direct facts to roundabout explanations. Well, the direct fact in this case is that, despite its dearth of water (of which the Murchison district was supposed to have a fair if not liberal supply), Coolgardie in two years has produced gold to the value of £875,655, as against Murchison in five years of £631,008. It is a pity the return does not give the number of tons dealt with by each district. Still, the figures as set forth are very instructive. If West Australia, under all the disadvantages which beset a new gold field, could, between 1886 and 1895—as a matter of fact, work can scarcely be said to have commenced until the nineties—produce 686,361 ounces, of a value of £2,608,172, it can not be denied, except by the tongue of ignorance or prejudice or both combined, that we have a gold field in this colony of great present and potential value. A comparison of the gold production of the Randt with West Australia for the same number of years would certainly not be favorable for the Randt.

RETURN OF GOLD, THE PRODUCE OF THE COLONY, ENTERED FOR EXPORT FROM JANUARY 1, 1886, TO DECEMBER 31, 1895, SHOWING QUANTITY AND VALUE.

[From the Mining World, London, February 22, 1896, pp. 330, 331.]

Year.	Quantity.			Value. *a*		
	Oz.	*dwt.*	*gr.*	£	*s.*	*d.*
1886	302	0	0	1,147	12	0
1887	4,873	0	0	18,517	8	0
1888	3,493	0	0	13,273	8	0
1889	15,492	10	0	58,871	10	0
1890	22,806	6	6	86,663	19	9
1891	30,311	1	9	115,182	1	2
1892	59,548	6	4	226,283	11	5
1893	110,890	18	5	421,385	9	2
1894	207,131	6	6	787,098	19	10
1895	231,512	13	21	879,748	4	8
Total	686,361	2	3	2,608,172	4	0

a The official valuation is £3 16s. per ounce.

AUSTRIA-HUNGARY.

According to official returns to this Bureau the value of the gold and silver product of Austria-Hungary *from its own mines* (not from the refineries, as was given in the report of this series for 1894) in 1893 was:

	Gold florins.	Silver florins (commercial value).
Austria	43,787	3,415,707
Hungary	4,090,882	2,161,315
Total	4,134,669	5,577,022

The gold florins represent in United States money $1,675,400 and a weight of 2,521 kilograms, fine, and the silver florins a United States silver dollar coining value of $3,745,900 and a weight of 90,132 kilograms, fine, which weight and values are substituted for those published in the report of 1894.

The value of the output of gold and silver from the mines of Austria-Hungary in 1894 was as follows:

	Gold florins.	Silver florins (commercial value).
Austria	9,907	3,000,171
Hungary	4,450,060	1,173,684
Total	4,459,967	4,173,855

The gold florins represent, in United States money, $1,807,200 and a weight of 2,719 kilograms, fine; and the silver florins, a United States silver dollar coining value of $3,470,900 and a fine weight of 83,515 kilograms.

The value of the production of gold and silver from the mines of Austria-Hungary in 1895 was as follows:

	Gold florins.	Silver florins (commercial value).
Austria	38,997.00	2,294,043.00
Hungary	4,869,641.16	1,231,346.68
Total	4,908,638.16	3,525,389.68

The gold florins represent, in United States money, $1,989,000 and a weight of 2,993 kilograms, or 96,218 ounces, fine; and the silver florins, a United States silver dollar coining value of $2,824,100 and a weight of 67,952 kilograms, or 2,184,265 ounces, fine, at which figures Austria-Hungary's production appears in the table of the World's Production of Gold and Silver in this report.

BOLIVIA.

No report has been received of the production of gold and silver in Bolivia in 1895. The output of silver during the year was probably less than in 1894, owing to the invasion of the Huanchaca mine by water.

The estimate of the silver output of Bolivia in 1894 was based on the report of Mr. Alfred St. John, British consul at Lima, viz, 684,418 kilograms. This seems a large amount when it is considered that in 1893 the silver product of Bolivia was only 428,000 kilograms.

In the absence of more definite information this figure is retained provisionally, and the silver production of Bolivia in 1895 is estimated to have been the same as in 1894, as is also its gold product.

BORNEO.[1]

Gold was at one time extensively sought for in the western parts of Borneo, but the natives have abandoned the search for the precious metal in favor of the more remunerative pursuit of agriculture. The

[1] The Board of Trade Journal, London, February, 1896, p. 144.

licenses issued to gold seekers were considerably fewer in 1894 than in prevous years. The gold mines of the eastern portion of Borneo do not furnish much happier results, on account of the scarcity of water, but there are deposits which have lately come under notice on the western coast of the Island of Celebes, in the province of Menado, on land conceded to the "Nederlandsch-Indische Mijnbouw-Maatschappij," which seem to promise better results. In 1894 some specimens of gold collected from native mines were considered satisfactory, and a gallery was excavated leading to a district said to be rich in auriferous products.

BRAZIL.

No report has been received by this Bureau of the production of gold in Brazil in 1895, and it therefore appears in this report at the same figure as in 1894, viz, 3,339 kilograms, fine, of the value of $2,219,500.

This figure is a mean between the estimates of the production made by Santa Anna Néry in 1889 and by Mr. Paul Ferrand in 1894, in his work on the Minas-Geraes mines. Mr. Ferrand wrote his book in Minas-Geraes and it was published there.

The above figures can be taken only as an estimate. Professor Lexis thinks them too high. He writes: "The principal mines of Brazil are Ouro Preto and San João del Rey (Morro Velho). The first produced during the business year ended June 30, 1895, £60,097 worth of gold. The latter has paid no dividends for a long time. In recent years, however, its situation has improved and its output of gold in 1895 averaged £10,000 to £11,000 per month, or about £125,000 in the entire year. The remaining mines, of which, for instance, the Santa Barbara mine has paid no dividends since 1886, produce scarcely more than 1,000,000 marks a year. For these reasons, I am induced to estimate the total production of Brazil at not more than 5,000,000 marks (or $1,190,000)."

As Mr. Ferrand wrote his book on the spot, only a few years ago, it is reasonable to assume that the figure he gives is approximately correct, which is all that is claimed for it here, and it is therefore allowed to stand, but only provisionally and subject to all reservation.

BRITISH INDIA.

The Bureau of the Mint has received the following communication showing the gold output of India and the import of gold bullion into India from China in 1895:

GOVERNMENT OF INDIA, FINANCE AND COMMERCE DEPARTMENT,
Calcutta, March 25, 1896.

SIR: In continuation of the letter from this department, No. 3920A, dated the 15th of August, 1895, I am directed to forward two statements, one showing the weight of gold produced from the mines in India during the calendar year 1895 and the other showing the weight of gold imported into India from China during the same period. As stated in this department letter No. 1311A, dated the 19th of March, 1895, it may be taken that the gold imported from China is all uncoined.

The statement of the production of gold now furnished is provisional, and further information, which is awaited from Mysore, will be sent you.

I have the honor to be, sir, your most obedient servant,

R. NATHAN,
Offg. Undersecretary to the Government of India.

The DIRECTOR OF THE MINT,
Washington, United States of America.

STATEMENT SHOWING THE WEIGHT OF GOLD PRODUCED FROM MINES IN INDIA DURING THE CALENDAR YEAR 1895.

Where produced.	Weight of bar gold.
	Kilograms.
State of Mysore	7,763.371
Madras Presidency	43.016
Total	7,806.387

STATEMENT SHOWING THE WEIGHT OF GOLD BULLION AND COIN IMPORTED INTO INDIA FROM CHINA DURING THE CALENDAR YEAR 1895.

Whence exported.	Where imported.	Weight.
		Kilograms.
China	India	1,390.419

These 7,806 kilograms, British standard 0.916⅔, represent 7,155.85 kilograms fine, of the value of $4,755,778, at which figures the gold output of India in 1895 appears in this report.

GOLD MINING IN INDIA.[1]

Although the gold-mining industry of the Colar district of southern India is still a comparatively small affair, it has shown satisfactory progress in the past year, the total production of the precious metal having been considerably larger than in any preceding year. For the past six years the aggregate returns have shown the following results:

Year.	Ounces.	Year.	Ounces.
1890	104,932	1893	207,125
1891	130,137	1894	209,729
1892	163,140	1895	249,355

In the six years, therefore, the production has increased to the extent of about 145 per cent, mainly owing to the contribution of the Champion Reef Company, an offshoot of the Mysore, which, though it only commenced regular crushings in July, 1892, now heads the list of the producing companies. In 1893 the average yield obtained was a little over 1½ ounces per ton; but in the following year it was barely 1 ounce 3 pennyweights. Last year, however, it averaged about 1 ounce 7 pennyweights, though a much larger proportion of the aggregate was provided by the treatment of "tailings."

[1] The Economist, London, January 11, 1896, pp. 37–38.

According to the monthly cables the results of the operations at the four principal mines during the past year were as follows:

Mines.	Mill.		Tailings.		Total 1895.	Total 1894.
	Tons.	*Ounces.*	*Tons.*	*Ounces.*	*Ounces.*	*Ounces.*
Champion Reef	51,645	67,485	13,660	3,475	70,960	53,516
Mysore	60,654	48,235	56,165	10,595	58,830	52,115
Nundydroog	32,965	37,093	7,775	1,520	38,613	29,745
Ooregum	53,370	57,787	59,965	12,562	70,349	68,224
Total	198,634	210,600	134,565	28,152	238,752	203,600

In each case there has thus been a more or less substantial improvement, the Champion Reef Company showing an increase of 17,444 ounces, or over 30 per cent. This company has at present 100 stamps at work, but 40 more heads are in course of erection, besides additional plant capable of dealing with an extra 5,200 tons of tailings per month. The reserves of quartz and tailings are estimated at a value of about £700,000, and have so steadily increased that the additional plant has become absolutely necessary. The recent average of the milling returns and the tailings treatment has been about 1½ ounces of gold to the ton.

In the other cases the reports indicate that the work of development is being conducted with a fair amount of energy, the deepest point yet reached in the district being about 1,460 feet in the Mysore mine. The lode in that property, from the 1,260-feet level to the lowest workings, averaged from 5 feet to 13 feet, giving assays ranging from 1 to over 2 ounces to the ton. During the year the Tank Block mine, jointly owned by the Mysore West and Mysore Wynaad companies, has started regular crushings, the average yield for the past two months having been something over 600 ounces; while at irregular intervals returns have been made by the Nine Reefs and Mysore Reefs companies, but against these has to be set the fact that the Balaghat Company, which was reconstructed some time ago, has not yet recommenced crushing, though recent reports seem to show that it will do so shortly. So far the Indian gold mines have done comparatively little toward fulfilling the glowing predictions which were made in their behalf when the late Mr. Brough Smyth made his report to the Indian Government fifteen years ago. Indeed, the Wynaad district, to which that expert attached especial importance, after absorbing a large amount of capital without producing any satisfactory results, has been practically given up as a bad job. Still, the original shareholders in the four dividend-paying mines have had no cause to regret their investment; while at the present time the returns obtainable upon the basis of recent dividends compare not unfavorably with most other gold mining shares. This will be apparent from the following table:

Mines.	Issued capital.	Price.	Dividend.	Yield.
			Per cent.	*Per cent.*
Champion Reef	£211,645	£5½	65	12⅛
Mysore	250,000	3½	35	10⅛
Nundydroog	200,000	1⅞	22½	12
Ooregum:				
Ordinary	145,000	2⅝	37½	14¼
Preferred	108,191	3⅜	47½	14

The dividends shown are those paid during the past twelve months, but except in the case of the Champion Reef Company, whose accounts are made up to the end of September, and have lately been presented, the balance distributions have yet to be

made, and should those be at a higher rate than the balance payments for 1894, the dividends for the calendar year will be increased to that extent. From the starting of the industry in 1884 the Indian mines have yielded gold to the amount of about £4,700,000; not a very large total, it is true, but not unsatisfactory under all the circumstances.

The following tables show the value of the gold produced from quartz crushings of the several mining companies operating on the Colar field of Mysore, India, from 1884 to 1895, inclusive:

TABLE I.—*Showing the heads of stamps erected, the tons of quartz crushed, ounces of gold produced and their value, by the companies now at work on the Colar Field of Mysore, India, for the year ended December 31, 1895.*

[From the Mining World, London, January 25, 1896, p. 149.]

Month.	Mysore.				Nundydroog.			
	Stamps.	*Tons.*	*Ounces. a*		*Stamps.*	*Tons.*	*Ounces. a*	
January	90	5,470	5,191	£20,299	*b* 40	2,700	3,143	£11,653
February	.....	5,140	4,953	19,821	.....	2,580	3,058	11,342
March	.....	5,630	5,435	21,157	.....	2,750	3,163	11,717
April	.....	5,520	5,478	21,220	.....	2,700	3,160	11,734
May	.....	5,200	5,453	21,273	.....	2,775	3,178	11,886
June	.....	4,875	5,056	19,762	.....	2,750	3,201	11,846
July	.....	*c* 3,800	*c* 3,620	*c* 14,275	.....	2,800	3,236	11,904
August	.....	4,440	4,844	18,940	.....	2,800	3,267	11,974
September	.....	5,259	5,563	21,642	.....	2,800	3,286	12,109
October	.....	5,020	5,699	22,120	.....	2,820	3,295	12,223
November	.....	5,050	6,029	*d* 23,363	.....	2,750	3,315	*d* 12,846
December	.....	5,250	6,123	*d* 23,727	.....	2,750	3,321	*d* 12,869
Total	90	60,654	63,444	247,599	40	32,975	38,623	144,161

Month.	Balaghat-Mysore.				Ooregum.			
	Stamps.	*Tons.*	*Ounces.*		*Stamps.*	*Tons.*	*Ounces. a*	
January	25	220	95	£365	110	4,072	5,361	£20,010
February	.....	150	81	299	.....	4,004	5,382	20,051
March	.....	About.	130	458	.....	4,231	5,533	20,677
April	.....	.....	.....	.....	.....	4,066	5,608	20,977
May	.....	.....	.....	.....	.....	4,321	6,046	22,648
June	.....	.....	.....	.....	.....	4,540	6,012	22,570
July	.....	.....	.....	.....	.....	4,826	6,039	22,674
August	.....	.....	.....	.....	.....	4,629	6,052	22,951
September	.....	.....	.....	.....	.....	4,521	6,028	22,339
October	.....	.....	.....	.....	.....	4,826	6,036	22,639
November	.....	.....	.....	.....	.....	4,599	6,045	*d* 23,425
December	.....	.....	.....	.....	.....	4,785	6,207	*d* 24,053
Total	25	370	306	1,122	110	53,420	70,349	264,234

a The ounces in this column includes total yield from all sources—crushing, treatment of tailings, cyanide process, etc.

b Thirty stamps in addition to the 40 at present working at the Nundydroog are expected to be completed and ready for use in the course of next month.

c In July the Mysore Company, through insufficient tank accommodation, ran short of water and was, consequently, only able to work 60 stamps for crushing and the cyanide process, the tailings machinery being idle for the month.

d The value here is estimated at £3¾ per ounce, the actual value for which the gold was sold not having yet been published.

TABLE I.—*Showing the heads of stamps erected, etc.*—Continued.

Month.	Champion Reefs.				Mysore West and Mysore-Wynaad (Tank Block).			
	Stamps.	*Tons.*	*Ounces.* [a]		*Stamps.*	*Tons.*	*Ounces.*	
January	80	3,900	5,635	£21,519	10	.....	.....	.....
February	.....	3,800	5,636	21,961	.....	200	77	[b] £299
March	.....	3,870	5,640	21,567	.....	350	156	[b] 605
April	.....	3,900	5,645	21,562	.....	350	160	[b] 620
May	.....	3,900	5,651	21,581	.....	395	264	[b] 1,023
June	[c] 100	4,490	5,910	22,598	.....	410	291	[b] 1,128
July	.....	4,700	6,008	22,956	.....	400	306	[b] 1,186
August	.....	4,750	6,068	23,172	.....	195	104	[b] 393
September	.....	4,750	6,101	23,285	.....	450	424	[b] 1,643
October	.....	4,850	6,204	23,968	.....	485	951	[b] 3,686
November	.....	4,780	6,228	[b] 24,134	.....	510	705	[b] 2,732
December	.....	4,855	6,237	[b] 24,169	.....	550	538	[b] 2,085
Total	180	52,545	70,963	272,472	10	4,275	3,976	15,400

Month.	Mysore Reefs (Kangundy).				Nine Reefs.			
	Stamps.	*Tons.*	*Ounces.*		*Stamps.*	*Tons.*	*Ounces.*	
January	26	60	68	[b] £264	40	260	147	[b] £500
February	.....	64	90	332	.....	303	146	519
March	.....	.....	.....	.....	.....	362	200	701
April	.....	120	128	487	.....	360	220	766
May	.....	.....	.....	.....	.....	371	205	738
June	.....	186	236	899	.....	350	133	412
July	.....	.....	.....	.....	.....	[d] 410	71	221
August	.....	.....	.....	.....	.....	310	64	[b] 248
September	.....	325	100	[b] 388	.....	.....	.....	.....
October	.....	350	113	[b] 438	.....	.....	.....	.....
November	.....	298	222	[b] 861	.....	.....	.....	.....
December	.....	317	116	[b] 450	.....	277	110	[b] 427
Total	26	1,720	1,073	4,119	40	3,003	1,296	4,532

Month.	Coromandel.				Yerrakonda.				Total for month.
	Stamps.	*Tons.*	*Ounces.*		*Stamps.*	*Tons.*	*Ounces.*		
January	0	.....	.....	.....	10	70	32	£117	£74,726
February	.....	500	217	£844	.....	142	52	193	75,661
March	.....	.....	.....	.....	.....	.....	.....	.....	76,882
April	.....	.....	.....	.....	.....	†	†	126	77,542
May	.....	.....	.....	.....	.....	.....	.....	.....	79,149
June	.....	.....	.....	.....	.....	.....	.....	.....	79,215
July	.....	.....	.....	.....	.....	.....	.....	.....	73,116
August	.....	.....	.....	.....	.....	.....	.....	.....	77,678
September	.....	.....	.....	.....	.....	.....	.....	.....	81,406
October	.....	.....	.....	.....	.....	.....	.....	.....	85,103
November	.....	.....	.....	.....	.....	.....	.....	.....	87,361
December	.....	.....	.....	.....	.....	.....	.....	.....	87,780
Total	0	500	217	844	10	212	84	436	.....

[a] The ounces in this column includes total yield from all sources—crushing, treatment of tailings, cyanide process, etc.

[b] The value here is estimated at £3 17s. per ounce, the actual value for which the gold was sold not having yet been published.

[c] June 10.—Forty stamps in addition to the 100 at present working at the Champion Reef are ordered and will shortly be erected.

[d] One hundred and thirty tons of this only was quartz, the remainder country rock. Ten stamps in addition to the 10 at present working at the Tank Block are expected to be completed and ready for use in the course of next month; 10 more have been ordered, and very likely by end of year, or earlier, there will be 40 stamps erected and at work on this property.

TABLE II.—SHOWING THE VALUE OF THE GOLD PRODUCED FROM QUARTZ CRUSHINGS BY THE MINING COMPANIES AT WORK ON THE COLAR FIELD OF MYSORE, INDIA, FROM JUNE, 1884 TO DECEMBER 31, 1895.

[From the Mining World, London, January 25, 1896, p. 150.]

Full list of gold-mining companies in the Colar Field of Mysore, India.	Year of registration.	Present capital (ordinary and preferred) authorized.	Value of gold produced in—											Value of gold produced from June, 1884, to Dec. 31, 1895.	Tons of quartz crushed from June, 1884, to Dec. 31, 1895.
			1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.		
Mysore	1880	£250,000	£4,431	£23,987	£62,520	£50,826	£73,972	£193,152	£229,961	£260,069	£249,393	£254,205	£202,302	£247,599	£1,852,417	£369,982
Ooregum	1880	265,000	.....	.....	.....	.....	15,246	62,503	104,041	132,974	202,887	280,970	256,785	264,934	1,320,340	198,204
Nundydroog	1880	220,000	.....	.....	.....	5,737	26,487	22,947	58,906	89,345	118,026	103,558	110,784	144,161	679,951	146,246
Mysore Reefs	1880	200,000	.....	.....	.....	.....	.....	542	812	730	.....	.....	1,027	4,119	7,230	4,435
Nine Reefs	1881	62,500	.....	.....	.....	551	3,071	5,273	868	.....	.....	.....	.....	4,532	14,295	10,876
Kempinkote	1893	187,500	.....	.....	.....	1,682	4,139	5,714	5,242	.....	.....	.....	.....	.....	16,777	14,285
Mysore West	1886	150,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,039	15,400	16,439	4,538
Balaghat Mysore	1886	200,000	.....	.....	.....	682	10,538	13,782	13,821	20,282	27,129	27,830	21,907	1,122	137,093	21,817
Mysore Wynaad	1886	150,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold fields of Mysore	1886	275,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yerrakonda	1894	45,000	.....	.....	.....	.....	380	233	.....	.....	.....	.....	.....	436	1,049	737
Colar Central	1886	200,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Champion Reef	1889	220,000	.....	.....	.....	.....	.....	.....	.....	.....	25,711	119,602	204,441	272,472	622,286	117,759
Coromandel	1892	120,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	844	844	500
Oriental	1895	137,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	.....	2,682,000	4,431	23,987	62,520	59,478	133,833	304,146	413,651	503,400	623,146	786,225	798,285	955,619	4,668,721	889,379

A few of the above companies have a small debenture of debt also.

The Kempinkote Company originated from a reconstruction of the Indian Consolidated Company, which before reconstruction worked in the Colar Field.

The Yerrakonda Company originated from a reconstruction of the Southeast Mysore Company.

The Mysore West Company and Mysore Wynaad Company work conjointly the Tank Block.

CANADA.

This Bureau has received the following data respecting the production of gold and silver in the Dominion of Canada in 1895:

GEOLOGICAL SURVEY OF CANADA, *May 2, 1896.*

DEAR SIR: In reply to your letter of the 28th ultimo, referring to the gold and silver production of Canada in 1895, I have much pleasure in furnishing you with the amounts, as per the inclosed memorandum.

Thanking you for your kind offer of reciprocal assistance,

Yours, truly,

GEORGE M. DAWSON.

PRODUCTION OF GOLD AND SILVER IN CANADA, 1895.

Province.	Gold.		Silver.	
	Ounces.	Value.	Ounces.	Value.
Nova Scotia	19,679	$406,764.93	.....	.....
Quebec	62	1,281.54	81,753	$53,343.83
Ontario	3,015	62,320.05	.....	.....
Northwest Territories and Yukon	7,257	150,002.19	.....	.....
British Columbia	62,435	1,290,531.45	1,693,930	1,105,289.32
Total	92,448	1,910,900.16	1,775,683	1,158,633.15

Final returns for British Columbia not all yet available, but the figures given are known to be very closely correct.

ELFRIC DREW INGALL.

Dr. G. M. DAWSON, C. M. G., etc.,

Deputy Head and Director, Geological Survey, Canada.

OTTAWA, *May 2, 1896.*

In the table of the world's production of gold and silver in 1895 the gold product of Canada is placed at $1,910,900, representing 2,875 kilograms, fine, and the silver product at 1,775,683 ounces, or 55,241 kilograms, fine, of the coining value of $2,295,833.

PRODUCTION OF GOLD IN BRITISH COLUMBIA.

[From the sixteenth annual report of the British Columbia Board of Trade, Victoria, B. C., 1895.]

KOOTENAY DISTRICT.

Exports of silver ore from Kootenay commenced in December, 1893, the exports for six months, to May 31, 1894, being 586,361 ounces, valued at $415,368. The shipments have increased since that date more than 100 per cent, the exports during the month of May, this year, amounting to 251,302 ounces, valued at $158,014. Some shipments from the Slocan subdivision averaged 214 ounces of silver to the ton of ore, which also contained 7½ per cent lead. Six hundred and forty tons of ore shipped from the Nelson subdivision averaged 116 ounces of silver, 12½ per cent of copper, and $2 in gold per ton.

In the Kootenay districts 1,215 mineral claims were recorded, 797 transfers made, and 962 certificates of work issued in 1894.

From the smelter at Pilot Bay, which commenced operations as late as March 9 last, 1,301 tons of bullion were shipped to Aurora, Ill., U. S. A., up to June 30 ultimo.

Activity in gold mining increases, and much capital has recently been invested in hydraulic workings, principally in Cariboo. The success which attended the short runs made by two companies during 1894 excited great interest. Last month a clean-up after a run of one hundred and seventy-two hours gave 66 pounds 3 ounces of gold, valued at $14,400. Several joint stock companies have been formed to prosecute gold mining on a large scale, and great increase in the output is looked for this year.

That profitable investments may be made in the mining industries of this province may be judged from the following result of the "War Eagle" mine, in West Kootenay, near the boundary line. The first cost and development work amounted to $32,500. Shipments of ore commenced on January 1 last, and $82,500 was paid in dividends up to June 1 ultimo. Shipments of ore during June averaged 420 tons per week, at an average value of $37 per ton. The ore is mined at $9.50 per ton. Freight and smelter charges amount to $14 additional per ton.

There were 97 placer claims recorded in the district of West Kootenay during the past year, and there are 36 mining leases in force.

In Yale district extensive work is being prosecuted. One hundred and forty mineral claims were recorded, 77 transfers made, and 125 certificates of work issued during 1894.

Prospecting continues on Vancouver Island. Assays of ore found near Alberni gave $103 and $135 value of gold per ton, with trace of silver.

Gold mining in the Yukon is at present restricted to workings in the creeks and gulches. This country, although known to be very rich in gold, is not yet thoroughly prospected, and is very difficult of access. As soon as these difficulties are overcome, it is anticipated that gold quartz mining will be prosecuted on a large scale.

The total Provincial output of gold during 1894 exceeded that of each of the three previous years.

During the twelve months ending June 30 ultimo 40 mining and smelting companies were incorporated in British Columbia to operate in precious ores, with nominal capital aggregating $24,344,000.

MINING IN WEST KOOTENAY.

To the Members of the British Columbia Board of Trade, Victoria.

GENTLEMEN: Since the previous general meeting twelve members of the board have visited Kootenay, and we now beg to report the information acquired and impressions received by them.

The tour included Trail, Nelson, Ainsworth, Kaslo, and Slocan mining divisions, and the principal properties in each were inspected.

From Revelstoke south the country traversed is mountainous, the higher summits exceeding 8,000 feet, upon which snow remains throughout the year.

The timber line appears to be 7,000 feet above the sea. Below this the growth is varied; in places there is an abundance of well-grown timber, whilst other parts are inferior in this respect, and some of the mountains are almost barren. Portions of the wooded area at high elevations are free of undergrowth and remarkably picturesque.

West Kootenay possesses many natural advantages, the most important of which are the navigable waters of the rivers and lakes, over 300 miles in length. On the Columbia River a first-class steamer service is operated by the Columbia and Kootenay Navigation Company as a feeder to the Canadian Pacific Railway. On the Kootenay River and Lake the same company has other steamers connecting at Nelson with the Kootenay and Columbia Railway, operated by the Canadian Pacific Railway and the Nelson and Fort Sheppard Railway. At Bonners Ferry the steamers connect with the Great Northern Railway, thus giving the district competitive rates with the Canadian Pacific Railway and the American transcontinental railways. There are several steamers plying on the lakes and rivers. Short lines of railways

have been constructed to bring the products of the mines to these waterways and to form a connection between the Columbia River and the Kootenay Lake. Considering how recently this country has been under development, it is well opened up.

The town of Rossland, situated 10 miles north of the boundary, dates only from the early part of this year, and is now the headquarters and central trading point of the Trail division. Over 200 well-built frame houses, including stores and hotels, have been erected on the townsite, and the population in and adjacent thereto numbers approximately 2,000 souls.

The Cliff was the first mine visited, distant about 15 minutes' ride from Rossland. The upper tunnel has been driven in 190 feet, and the ore averages $35 per ton in gold and copper. Shipments have already commenced. Passing on to the Le Roi we found extensive works in operation, upon which the sum of $150,000 has been expended. The main shaft from which the ore is taken is down 375 feet, and the present output is 100 tons per diem. The average value of the ore is $40 per ton in gold, silver, iron, and copper. The vein is in no place less than 6 feet in width and in the lower levels widens to 30 feet; the best ore yet found was taken from the bottom of the shaft. Eighty-five men are employed in connection with this mine, the miners and helpers being paid $3.50 and $3 per day, respectively. The ore costs to mine $3 per ton; transportation by wagon to Northport, freight to the smelter, and treatment an additional $13.50. It will thus be seen that there remains a good margin of profit, and at the date of our visit there was the sum of $50,000 cash available for the payment of a dividend; this over and above the repayment of all outlay on the mine by sale of ore. The War Eagle adjoins the Le Roi, and the character and value of the ore are very similar to the last named. As this mine is referred to in the annual report, it is only necessary to state that another dividend of $50,000 has since been declared, making the total $132,000 paid within six months. Ore has been shipped from other properties in this division, notably from the Josie, and much development work is progressing at all points. All around this center the mountains are alive with prospectors and miners; 1,600 new claims have been recorded within the past six months, and there is reason to believe that many of them when developed will reveal minerals in richness and quantity as great as any mine now in operation. Prior to 1890 very little was known of this division and the present activity is due to the recent development of the Le Roi and War Eagle mines, both of which have paid ever since work commenced on them. The fact that the veins of ore so far developed increase in width and richness with depth is an unmistakable indication of permanency. A smelter is being erected at Trail, on the Columbia River, for the treatment of the ore of this district.

The next mine visited was the Poorman, on Eagle Creek, near Nelson, where there is a 10-stamp mill in operation, with a capacity of 20 tons per day. The ore averages about $20 in gold per ton, the vein from which it is taken varying from 10 inches to 2 feet in thickness. Other veins have been found on the claim, and the development work has exposed a large quantity of ore rich in gold. The Silver King is situated 5,000 feet above, and as the crow flies is about 4¼ miles from Nelson. Here ore is already in sight to an estimated value of $3,000,000. Six hundred and forty tons shipped carried silver, 116 ounces; copper, 12 per cent; and gold, $2 per ton. The aerial tramway is nearly completed. It will connect the mine with a smelter now in course of erection at Nelson. There are several other rich mines on Toad Mountain tributary to Nelson.

The town of Nelson was laid out seven years ago. Many substantial buildings have since been erected and the principal Government offices of the district are located there, as well as branches of the Bank of British Columbia and the Bank of Montreal. The population of and tributary to Nelson is probably 1,000 souls.

The largest body of ore yet found in Kootenay is at the Blue Bell mine, situated on the Kootenay Lake, about opposite Ainsworth. The tunnel, 1,100 feet in length, entered almost immediately upon stepping off the steamer, is at the far end 170 feet below the surface of the hill. Although ore has been taken out in places to a width of over 70 feet, *the foot wall* has not yet been found, and the vein has been traced

for nearly a mile in length. It is composed of ores containing silver, gold, galena, and copper; value from $11 to $30 per ton. The ore is treated at the smelter at Pilot Bay, some 7 miles distant, the mine being owned by the smelter company.

The Pilot Bay smelter is equipped with machinery of the most modern type and the arrangements generally are such that manual labor is reduced to a minimum in every branch. At the time of our visit 100 tons of ore were being treated daily.

Ainsworth, situated on the opposite side of Kootenay Lake, is one of the oldest camps in the district. Some mines tributary thereto are being worked and produce silver ore proper, known as dry ore.

The town of Kaslo, 10 miles north of Ainsworth, is a busy mining center. It has only been in existence about three years, and notwithstanding serious reverses by fire and flood it stands to-day on a more solid basis than ever. The Kaslo and Slocan Railway is now being built from this point to Cody Creek, distance about 30 miles, with a branch into Sandon. It will probably be ready for traffic at the end of October.

We left the train 15 miles from Kaslo and proceeded to Three Forks by way of the Jackson divide and Sandon. En route the Northern Bell was visited, a mine upon which considerable development work has been done. Five hundred tons of ore have been shipped, averaging 90 ounces of silver per ton and 70 per cent lead, and we found 200 tons more were nearly ready for shipment. The vein of concentrating ore varies from 6 to 20 feet in thickness. The ore vein of the Noble Five, 3 to 4 feet in width, has been disclosed to a depth of 300 feet and the bottom is not yet found nor is the length known. Three thousand feet of tunnels have been driven in, and 20 men were continuing the work in day and night shifts. The miners work ten hours per day, for which they are paid $3.50. There have been shipped from this mine 1,800 tons of ore and we saw several thousand tons of concentrating ore on the dump, worth probably $30 per ton.

The shipping ore contains an average of 135 ounces of silver per ton and 73 per cent of lead. The ore is steel, wavy and cube galena, and carbonates. Four-fifths of this mine is still owned by the locators. The Deadman mine adjoins the last named, and the ore is of similar character. The vein is 4 feet wide and has been traced 200 feet deep. About 300 tons of ore were stacked and ready for shipment, quality being equal to a car load shipped, which averaged 150 ounces of silver to the ton and 40 per cent of lead. The Last Chance, situated on the Noble Five Mountain, is also a very promising mine, having paid from the start. Development commenced in August, 1894. Two tunnels have been driven, aggregating in length 300 feet; also an adit-level to tap the vein 150 feet below the croppings. The vein stands nearly vertical, with an average of 12 inches of solid ore and carbonates scattered through the ledge up to 14 feet in width. One hundred and thirty tons of ore shipped gave 175 ounces of silver per ton and 75 per cent of lead. The last mine visited was the Slocan Star, located on Sandon Creek. Croppings in the creek led to its discovery in October, 1891. Extensive development has been carried out, and the vein has been exposed to a depth of 450 feet. At some points the vein is 50 feet wide, 8 feet of which has simply to be broken, sacked, and shipped. Three thousand four hundred tons of ore have been shipped from this mine and averaged 100 ounces of silver per ton and 70 per cent lead. There remains about 20,000 tons of concentrating ore on the dump. In connection with this mine a concentrating mill is being erected; also a gravity tramway for transporting the ore from the mine to the mill. Twenty-eight mines have already shipped ore, and in nearly every case arrangements are being made to continue shipping on a larger scale. As there is much development work progressing at numerous claims, the outlook of the Slocan division is very promising. The Nakusp and Slocan Railway affords several mines in this division the advantage of competitive rates with its rival, the Kaslo and Slocan.

At Three Forks, a mining town of very recent origin, there is a concentrating mill in operation. Another concentrator is to be erected immediately at the Washington *mine.*

Quite apart from the industry of mining proper West Kootenay offers an excellent field for the investment of capital in concentrators and smelters, the necessity for which is an inevitable consequence of mining developments. It can not be very long before the need of refineries will have to be met.

The trade of the district is already large and rapidly increasing.

Through the courtesy of the Canadian Pacific Railway Company, Mr. William Brown, assistant general freight agent, accompanied the party, and we understand will recommend, as occasion may require, the adoption of more advantageous freight rates between Kootenay and other parts of the Province. The route taken by the party lay through magnificent scenery, that on the Columbia River being especially grand. Few of the inconveniences so often met with in traveling through a new country were experienced, and in this respect the tour was particularly enjoyable. The streams afford excellent fly fishing, and trawling on the lakes can be engaged in with equal success. Big game, such as caribou, bear, sheep, and goats are to be obtained on the mountains. Indeed, the facilities for sport and travel are so great that they have only to become known to attract considerable tourist traffic.

Even if no new discoveries were made it would not be too much to say that the future of West Kootenay is assured. It should, however, be borne in mind that but a very small portion of its area has so far received attention at the hands of prospectors. Scarcely a week passes without news being received of fresh finds, all of a nature to encourage and strengthen the belief that so far the merest fraction of the wealth of the country has been ascertained. Within the limited time and space at our disposal for the compilation of the foregoing report it was impossible to do more than refer very briefly to the wonderful resources of the district visited, but we have endeavored above all things to obtain and lay before you information which may be relied on. This, we believe, we have accomplished, and would merely add in conclusion, each member of the party is personally satisfied with the result of his trip as confirmatory of the unlimited wealth of West Kootenay.

D. R. KER, *President.*
GUS LEISER, *Vice-President.*
F. ELWORTHY, *Secretary.*

VICTORIA, B. C., *September 21, 1895.*

MINING IN ALBERNI.

The district of Alberni, on the west coast of Vancouver Island, has during a long period produced small quantities of placer gold, but it is only in recent years that attention has been directed to the quartz ledges of the district. The first claims were staked off at the head of China Creek in 1892, and in the following year numerous other claims were taken up. In the early part of 1894 some claims on Mineral Creek, a branch of China Creek, were to some extent developed, and excellent returns have been secured from the various assay tests. During the past few months, however, increased interest has been centered in this district, consequent upon the discovery of many other promising lodes and the improved aspect of those under development. The work done thus far has been sufficient to prove the width of the veins and obtain sufficient ore for assay and mill tests. From surface indications there is every probability of a number of paying mines being established in the near future.

Hydraulic claims are being opened up on China and Mineral creeks, with favorable prospects. The gold varies in character from fine to coarse.

The mild climate makes it possible to continue work on these mines the year round, while their proximity to the navigable waters of Alberni Canal insures cheap transportation of ores to coast smelters.

The Provincial Government had a report made during the summer upon the minerals of this district, which describes the numerous gold-quartz ledges and gives the names of the various rock formations in which the gold quartz appears. A rough map of the section accompanies the report.

CHILE.

According to the information obtained and forwarded to the Bureau of the Mint by the United States minister at Santiago, the production of gold in Chile in 1895 was 2,118 kilograms, fine, of the value of $1,407,623, and the production of silver 156,542 kilograms, fine, of the coining value of $6,505,886.

CHINA.

The Bureau of the Mint estimates the annual production of gold in China to be equal to the sum of the exports of that metal from the Empire, in the form of bullion, to Great Britain and India. The exports of gold bullion from China and Hongkong to Great Britain in 1895 amounted to 141,125 ounces, or 4,389.484 kilograms .916⅔ fine, or 4,023.694 kilograms fine.

The export of gold bullion from China to India in 1895 was, according to the information furnished this Bureau by the Government of India, 1,390.419 kilograms .916⅔ fine. The total export of gold bullion from China to Great Britain and India in 1895 was, therefore, 5,779.903 kilograms .916⅔ fine, or 5,298.244 kilograms fine, of the value of $3,521,213, at which figure the gold output of China in 1895 appears in the table of the world's production of gold and silver in this report.

COLOMBIA.

No returns having been obtained from Colombia, its production of gold and silver in 1895 is assumed to have been the same as in 1893, viz, 4,353 kilograms of gold, valued at $2,892,800, and 52,511 kilograms of silver, of the coining value of $2,182,400.

ECUADOR.

The production of gold in Ecuador in 1895, in the absence of any information, is assumed to have been the same as in 1894, viz, 103 kilograms.

Hon. James D. Tillman, Envoy Extraordinary and Minister Plenipotentiary of the United States at Quito, writes under date of March 25, 1896:

SIR: In compliance with a communication from the Secretary of State, bearing date of February 4, 1896, and received by me on March 9, inclosing 26 interrogatories, especially asking an early answer to Nos. 12, 13, 14, and 15, I have the honor to state in reply that there can be given no definite and reliable information as to the production of gold and silver in this country.

There is no mint in Ecuador. There are no silver mines in operation in the Republic, and only one gold mine, that of the "Plaza de Oro," near Esmeraldas, on the Pacific Coast. No reports are made to the Government.

* * * * * * *

One reliable merchant here informed me (and exhibited his books) that he had purchased in the five years last past 124 packages of gold dust in bottles, each package of 100 ounces, all of which was sent to France. Two other purchasers inform *me that their* shipments of gold were about the same.

It is all purchased in small quantities, chiefly from Indians, or from those who buy from Indians, and was by them "washed" out in Ecuador on the eastern range of the Andes, on the head waters of the Maranon and Amazon rivers, or the rivers from southern Colombia flowing eastward into the Napo and Maranon.

I am, sir, your obedient servant,

JAMES D. TILLMAN.

Hon. R. E. PRESTON,
Director of the Mint, Washington, D. C.

FRANCE.

No returns of the production of the precious metals in France in 1895 have been received by the Bureau of the Mint. Respecting its product in 1894, M. De Foville has furnished the following information:

There was produced by the refineries of France, according to the declarations of those institutions, in 1894, 376 kilograms of gold, of the value of 1,203,200 francs, and 96,955 kilograms of silver, of the commercial value of 10,665,050 francs.

All the gold is obtained from foreign ores treated in France. As to silver, the French mines produced in 1894 a quantity of ore representing 26,168 kilograms of silver, of the value of 2,878,000 francs.

In view of the statement that all the gold "produced" in France is obtained from foreign ores treated there, it becomes necessary to cease crediting that country with any gold. It has always been the endeavor of this Bureau to credit each country, not with the quantity of the precious metals refined there, but with the quantity actually extracted from its own mines. It is usual in Europe to speak of gold smelted in a country simply as having been produced there. The reports hitherto received from France have merely stated the fact that so much gold was produced in that country in a given year, without stating whether it was the product of the refineries or the mines. This doubt has been cleared away by the statement of M. De Foville that "all the gold is obtained from foreign ores treated in France."

For the same reason that France is credited with no gold in 1894 its product of silver is placed at the amount of that metal yielded, not by the refineries, as in past years, but by its own mines, i. e., 2,878,000 francs, commercial value, or 26,168 kilograms, of the coining value of $1,087,542. The silver output of France in 1895 is assumed to have been the same as in 1894.

GERMANY.

Regarding the production of pure gold in Germany in the years 1892 and 1893, the United States Embassy at Berlin obtained the following information from the Imperial Government:

Pure gold.—In the year 1892, 3,859.2 kilograms (of the value of 10,735,775 marks), of which 718 kilograms were obtained from ores exported from countries outside the Zollverein.

In the year 1893, 3,073.53 kilograms (of the value of 8,552,817 marks), of which 818 kilograms were obtained from ores imported from countries outside the Zollverein.

As the Zollverein embraces all the gold-mining districts of the country, the gold production of Germany in the two years 1892 and 1893, as

published in the Reports of this series for those years, was obtained by deducting the amounts extracted from foreign ores from the total amounts smelted in Germany, which gave for 1892 a gold product of 3,141.2 kilograms, of the value of $2,087,642, and for 1893 a gold product of 2,255.3 kilograms, of the value of $1,498,872.

Respecting the production of pure gold in Germany in 1894, the Imperial Foreign Office of the Empire communicated the following information to this Bureau through the Hon. John B. Jackson, Chargé D'affaires, of our Embassy at Berlin:

> Of the 4,133.46 kilograms of pure gold smelted in the German Empire in the year 1894, 912 kilograms were obtained from foreign ores.

It seems to be a clear inference from this that 3,221.46 kilograms of pure gold were extracted in 1894 from ores mined in the German Empire.

This figure did not appear in the table of the world's production of Gold and Silver in the Report of this Bureau on the Production of Gold and Silver for the year 1894, as it had not been received when that Report was sent to press. It was published, however, in the table in the Report of the Director of the Mint, 1895.

The data sent the Bureau by the German Government through our Embassy at Berlin, relative to the production of gold in 1895, are as follows:

> The amount of the production of gold from domestic mines during the year 1895 can only be estimated. * * * The total production of gold from domestic ores during the three years mentioned (1893, 1894, and 1895) can hardly have amounted to 100 kilograms a year.

Thus, while from the earlier information received from Germany it was plainly deducible that the gold product of that country in 1893 and 1894 was 2,255 kilograms and 3,221 kilograms respectively, the later information obtained is that it can "hardly have amounted to 100 kilograms" in either of these years.

Professor Lexis, in a recent article in Conrad's Jahrbücher, offers a probable explanation of the earlier statistics for 1893 and 1894 sent out by the German Government and accepted by the Bureau. He writes:

> Germany produces an entirely insignificant quantity of gold from its own ores (auriferous silver ores). In the official statistics of the products of German smelters large quantities of gold are mentioned, but this gold is obtained almost exclusively from foreign material, and it is an error to assume the greater part of these quantities of gold to be of German origin, as is done in the Report of the Director of the Mint of the United States. The Director, indeed, relies on official information, according to which, in 1893, for instance, out of 3,073 5 kilograms of gold 818 were obtained from imported ores, so that 2,255.5 kilograms remained as of German origin. The error may probably be accounted for by the fact that these 818 kilograms represent the quantity of gold obtained from foreign gold ores proper; but besides this amount there is the much larger quantity separated from foreign auriferous silver ores and auriferous silver, so that the amount of gold remaining to be credited to *the account* of Germany really amounts to only a few kilograms.

If we adopt the method followed by the Director of the Mint of the United States, according to which the precious metal is credited to the country that produces the ore, it would be best to omit Germany entirely from the list of gold-producing countries.

Dr. Soetbeer, several years ago, recommended this same course, and his advice was actually followed in the report on the production of gold and silver in 1891, page 72, where the Director of the Mint (Mr. E. O. Leech) says:

Although Germany smelted 3,077 kilograms of gold in 1891, it produced scarcely any from its own mines, and is, therefore, credited with none in our table of the world's production of gold and silver.

It must be noted, however, that by dropping Germany entirely from the list of gold-producing countries a part of the world's total gold output is left unrecorded; for, as Professor Lexis says in another part of the article referred to—

In the figures showing the world's production of gold and silver for the years 1885 to 1894, both inclusive, given in the reports of the Director of the Mint of the United States, Germany is credited with a gold product of 1,000 to 3,000 kilograms, although the real gold production from its own ores is insignificant. *As, however, the greater part of this gold has been separated from silver whose gold contents do not figure in the statistics of any other country, it is not improper to embrace it as an item in the world's production of gold.*

The gold output of the German smelters from 1892 to 1895 was officially reported as follows:

	Kilograms.		Kilograms.
1892	3,859.2	1894	4,133.46
1893	3,073.53	1895	4,460.81

Now, as Professor Lexis says, the greater part of this gold has been parted from silver whose gold contents do not figure in the statistics of any other country. It may be safely assumed that at least three-fourths of it have been so parted, and in order that it may figure in the world's output of gold, Germany is credited in the table of the world's production with three-fourths of the annual output of its smelters, adding a note that the amounts so credited to that country are "gold separated in Germany from silver whose gold contents do not figure in the statistics of any other country." Opposite Germany, in the table of the world's production, in the column headed "Gold," in the present Report, therefore, appear the figures—

	Kilograms.
1893	2,305
1894	3,100
1895	3,345

If the year 1892 appeared in the table there would have been set opposite Germany 2,895 kilograms of gold, of the value of $1,924,000, not as the product of its own mines, but as gold parted in Germany from silver imported from foreign countries, but whose gold contents had not been credited to such countries.

Respecting the production of silver in Germany in 1895, the following information has been received:

According to this estimate (of the production of silver from domestic mines), which has been extended so as to include the years 1894 and 1893, the amount of silver obtained from German ores was as follows:

	Kilograms
In 1895, about	181,000
In 1894, about	193,000
In 1893, about	179,000

The figures here given for 1893 and 1894 vary considerably from those previously furnished the Bureau and published in the Reports of this series on the production of these years; they are, however, adopted in the present Report as representing Germany's silver production in the two years last named.

GREAT BRITAIN.

The gold product of Great Britain in 1895 was 161.5 kilograms, fine, valued at £22,055, or $107,000; the silver produced was 8,722 kilograms, fine, of the commercial value of £34,908 and of the coining value of $362,500.

GREECE.

Greece produces no gold.

With reference to Greece's output of silver in 1895, the United States Minister to that country furnishes the following information:

There are no statistics as to the value of silver produced from the mines of the country, but a small amount of argentiferous ore from mines at Laurium was exported to England and France.

In the absence of definite information regarding the silver output of Greece in 1895, it is assumed to have been the same as in 1894, viz, 35,436.7 kilograms, fine.

THE GUIANAS.

BRITISH GUIANA.

On the production of gold in British Guiana in 1895, the following dispatch was received by the Department of State and by it transmitted to this Bureau:

CONSULATE OF THE UNITED STATES,
Demerara, British Guiana, June 11, 1896.

SIR: I have the honor to inclose herewith a report showing the production of gold in the Colony of British Guiana for the calendar year of 1895. The gold is not refined, so it is impossible to state its "fineness."

This report was called for by letter dated April 27 from the Director of the Mint, received May 25.

I have, etc.,

ANDREW J. PATTERSON,
Consul.

Hon. W. W. ROCKHILL,
Assistant Secretary of State, Washington, D. C.

RETURN OF GOLD FOR CALENDAR YEAR 1895.

Month.	Weight.			Month.	Weight.		
	Ozs.	*dwts.*	*grs.*		*Ozs.*	*dwts.*	*grs.*
January	5,876	14	5	August	10,031	5	19
February	6,999	10	5	September	9,811	15	3
March	9,686	6	21	October	12,186	17	3
April	11,145	12	10	November	9,389	1	10
May	12,810	18	21	December	14,338	0	21
June	9,749	5	18	Total	122,935	14	21
July	10,910	6	5				

The crude gold of British Guiana is valued at $18 per ounce; the value, therefore, of the 122,936 ounces produced in 1895 was $2,212,848, representing 3,329,593 kilograms, fine.

GROWTH OF THE GOLD PRODUCT OF BRITISH GUIANA.[1]

Fortunately for the Colony, the depression in the sugar trade has been attended by the discovery of very rich gold deposits. The gold exported by British Guiana in 1884 was only 250 ounces, valued at £1,020, while in the year to March 31, 1894, the gold shipped reached 137,788 ounces, valued at £511,363. In 1894–95 the export was 135,028 ounces, valued at £500,446. For the eight years to March 31, 1895, the gold shipped has amounted to 650,000 ounces, of which 420,000 ounces have been produced in the last four years. The gold exported since 1884 has been as follows:

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Ounces.				
1884	250	£1,020	1890	62,840	235,093
1885	940	3,249	1891	101,601	376,385
1886	6,668	23,842	1892 *a*	133,594	494,551
1887	11,951	44,551	1893 *a*	137,788	511,363
1888	16,986	64,404	1894 *a*	135,028	500,446
1889	28,403	109,683			

a Year ended March of the year following that stated.

The whole of the gold so far produced is alluvial, found on the banks of almost every tributary of the rivers Essequibo, Mazaruni, Cuyuni, Barima, and Demerara, the finds in some cases being extremely rich. In the Barima district, lying to the northwest of British Guiana and close to the Venezuelan frontier, quartz mining has commenced, and the reefs are reported to vary from 12 inches to 6 feet, with assays ranging up to over 150 ounces to the ton. The prospecting work so far has, however, been very slight, the means of communication with the interior being very defective, as the mountainous nature of the country prevents navigation of the rivers by steamers for more than 40 or 50 miles. With more scientific prospecting and the development of quartz mining, it is believed that the gold output will be enormously increased.

DUTCH GUIANA.

The production of gold in Dutch Guiana in 1895, according to the Handels-Archiv, June, 1896, was 733,924 kilograms, of the value of $487,766.

[1] From the Statist, London, February 29, 1896, p. 294.

FRENCH GUIANA.

In the last report of this series the production of gold in French Guiana in 1894 was estimated at 2,000 kilograms. In the light of the information contained in the following extract from an official document published by the French Government, that estimate must be changed:[1]

At the beginning of 1894 the placers of French Guiana were, in great part, abandoned, in consequence of the discovery of gold in the territory in dispute between France and Brazil. However, as a part of the gold obtained in the disputed territory passed through Cayenne, the customs data, which are the only elements of statistics possessed on the matter, show a large increase of gold production.

The quantity of gold declared at the custom-house, which was 1,680 kilograms in 1893, rose to 4,836 kilograms in 1894; but this figure can be accepted only with the reservation just made.

The amount of 1,680 kilograms for 1893 is inferior to the real amount of the production during that year, because of fraud. The real amount of the production of that year was between 2,000 and 2,500 kilograms.

The value of gold at Cayenne is 2.85 francs per gram for natural gold and 2.70 per gram for amalgamated gold. The value of the gold declared at Cayenne in 1894 was about 13,500,000 francs.

It seems entirely proper to credit French Guiana with a gold product in 1894 of the value of 13,500,000 francs, or $2,605,500, representing 3,920.403 kilograms, fine, notwithstanding the fact that part of this output may have been mined not in French Guiana proper, but in a district in dispute between it and Brazil. The gold credited to Brazil in this report was not produced in the disputed territory, but in Minas-Geraes. There is therefore no duplication in crediting it to French Guiana.

A new estimate of the colony's output of gold in 1893 is also desirable. It may be taken at the mean between the maximum (2,500 kilograms) and minimum (2,000 kilograms) given above, namely, at 2,250 kilograms, which, calculated at the average price of natural and amalgamated gold, or 2.70 francs per gram, gives a total value of 6,075,000 francs, or $1,172,475, representing 1,764.181 kilograms, fine—the estimated gold yield of the colony in 1893.

The production of French Guiana in 1895 is assumed to have been the same as in 1894.

ITALY.

Mr. Larz Anderson, secretary of our embassy at Rome, has sent this Bureau the following:

The Secretary-General of Foreign Affairs, in his note transmitting the inclosed replies, states that the "Minister of the Treasury informs him that answer could not be provided to interrogatories numbered 12 and 13, regarding the production of gold and silver, as the Inspector of Mines had not yet calculated the statistics." He, however, adds that "the production of gold and silver in the Kingdom can not have varied in any marked degree from that of preceding years."

Italy's output of gold and silver in 1895 is therefore assumed to have been the same as in 1894.

[1] Statistique de L'Industrie Minérale en France, pour l'Année, 1894, p. 59.

JAPAN.

The production of gold and silver in Japan in 1895 is calculated, as in previous years, by adding the product of the Imperial Household Mines in 1895 to that of the private mines two years previous, thus:

GOLD AND SILVER PRODUCT OF JAPAN IN 1895.

Mines.	Gold.		Silver.	
	Weight.	Value.	Weight.	Value.
	Kilograms.	*Yen.*	*Kilograms.*	*Yen.*
Government mines, 1895	333.936	400,326.448	8,521.085	327,448.787
Private mines, 1893	444.259	390,922.703	58,833.468	2,336,488.845
Total	778.195	791,249.151	67,354.553	2,663,937.632

The values of silver given in the above table are commercial values.

The coining value of 67,354.553 kilograms, the silver product of Japan in 1895, was $2,799,255, and of 778.195 kilograms, the gold product, $517,188, at which figures they appear in the table of the world's production of gold and silver in this report.

The above data have been obtained from the Japanese Government by the United States Minister at Tokyo.

KOREA.

The production of gold in Korea in 1895 may be estimated as equal to the export of that metal from the country, viz, 35,934 ounces, of the value of 1,352,929.06 Mexican dollars, equal, at the average value of the Mexican dollar in 1895, $0.517, to $699,464 United States gold, representing 1,052,459 kilograms, fine. The United States Consul at Seoul writes that the export, and consequently the production, is probably double this amount, due to smuggling over the border and gold carried away in passengers' baggage.

MEXICO.

Respecting the production of gold and silver in Mexico in 1895, the Bureau of the Mint has received the following information from the Department of the Treasury of Mexico:

PRODUCTION OF GOLD AND SILVER IN MEXICO DURING THE CALENDAR YEAR 1895.

Description.	Gold.		Silver.	
	Weight.	Value.	Weight.	Value.
	Kilograms.		*Kilograms.*	
Coined	783.481	$504,193	634,952.338	$24,832,351
Exported	7,489.498	5,058,534	826,056.138	33,798,087
Total	8,272.979	5,562,727	1,461,008.476	58,630,438

PRODUCTION OF GOLD AND SILVER IN MEXICO, ETC.—Continued.

RECAPITULATION.

Description.	Weight.	Value.
	Kilograms.	
Gold	8,272.979	$5,562,727
Silver	1,461,008.476	58,630,438
Total gold and silver	1,469,281.455	64,193,165

These amounts do not constitute the total production of gold and silver for 1895, but the above amounts show two of its most important factors. Data necessary for the proper estimates of the quantities of precious metals in the possession of miners and mine owners, as well as of the amounts deposited in the banks, the quantities employed in the arts and industries, and the amount which is secretly exported from the country, notwithstanding the precautions taken by the Government to prevent such smuggling, are still wanting.

The production of silver in Mexico given above appears in the table of the world's production of gold and silver as the silver output of Mexico in 1895, this Bureau having no data of the quantities retained by miners and smelters, or of those deposited in Banks, employed in the industrial arts, or clandestinely exported.

In the case of the gold product of Mexico in 1895, as in 1894, this Bureau, for the same reason, has felt it incumbent to change the item of the gold exports, as the imports of gold bullion and the amount of gold obtained by private refineries in the United States from Mexican ores imported into the United States in 1895 were almost as large as the total exports of gold from Mexico as given in the statement above furnished by the Treasury Department of that country.

The amount of gold bullion imported from Mexico and deposited at the United States Assay Office at New York and at the Mint at San Francisco is shown by the following correspondence:

UNITED STATES ASSAY OFFICE AT NEW YORK,
SUPERINTENDENT'S OFFICE,
June 18, 1896.

SIR: In reply to yours of the 15th instant I give below the amount of gold bullion received at this institution from Mexico during the calendar year 1895. It was all stamped as coming direct from Mexico.

We have received no refined gold bullion as coming from Mexico.

Gold deposits	$194,546.36
Parted from silver	366,228.52

Respectfully, yours,

ANDREW MASON, *Superintendent.*

Hon. R. E. PRESTON,
Director of the Mint, Washington, D. C.

MINT OF THE UNITED STATES AT SAN FRANCISCO,
SUPERINTENDENT'S OFFICE,
June 22, 1896.

SIR: Replying to yours of the 15th instant I beg to state that the total amount of gold bullion deposited at this mint for the calendar year ending December 31, 1895, from Mexico, was 27,130.026 standard ounces, all of which was crude. No refined bullion deposited.

Respectfully, yours,

JOHN DAGGETT,
Superintendent.

Hon. R. E. PRESTON,
Director of the Mint, Washington, D. C.

Considering that the private refineries of the United States extracted 185,943 ounces, fine, of gold from Mexican ores and bullion imported into this country in 1895, and the data contained in the above letters, this Bureau feels constrained to use the figures supplied it by the private refineries of the United States and by the superintendents of the United States Assay Office at New York and the United States Mint at San Francisco, instead of the figures officially communicated by the Mexican Government. The gold product of Mexico in 1895 is, therefore, estimated to have been as follows:

Description.	Value.
Gold coined in Mexico	$504,193
Gold extracted from Mexican ores and bullion by United States private refineries	3,843,783
Gold bullion deposited at United States assay office at New York	560,775
Gold bullion deposited at United States mint at San Francisco	504,745
Total	5,413,496

As Mexico exports quantities of gold ore and, doubtless, some bullion, to countries other than the United States, as it retains some at home, and employs some in the industrial arts, it seems reasonable to estimate the total gold product of Mexico in 1895, at $6,000,000, representing 9,028 kilograms, fine, at which figure it appears in the table of the world's production of gold and silver in this report.

LAS PRIETAS MINERAL REGION.[1]

I have the honor to transmit herewith an English translation from the Nogales (Ariz.) Oasis of an interesting sketch from a Mexican newspaper of the mineral region of Las Prietas, in this consular district, which, as is stated therein, "intelligent miners, native and foreign," regard as "one of the most important mining regions of the entire world."

FRANK W. ROBERTS, *Consul.*

NOGALES, *December 28, 1895.*

MINERAL DISTRICT OF LAS PRIETAS, SONORA, MEXICO.

It was toward the middle of the last century (about the year 1743) when, according to reliable accounts, the existence of rich deposits of gold in this most important region of our State became known, the mines Sierritas, Verde, Agua, and Colorada

[1] Consular Report, March, 1896, p. 376.

being thus discovered and worked by Jesuit missionaries, who established at that time the real of Aigame as the nearest point to water for the treatment of the ores, which they took out in large quantities from said mines until the persistent molestation of the Pima and Seri tribes compelled them to abandon the district. Afterwards, in 1790, miners from Aigame and Las Placitas exploited for eight or ten years with good results the mines Prietas, Verde, and others, but some of them becoming flooded and others abandoned they all remained at the mercy of the chloriders, who many years worked them after their own fashion without greater advantage.

The importance of these mines was revealed solely by observing the magnitude of the ancient workings, the large number of arastras, the immense dumps of tailings, and the ruins of large buildings, which still are to be seen at said points, Aigame and Las Placitas, known at that time as the "Real de Candelaria."

The mines being abandoned for the space of many years, the active and expert miner, Don Ricardo Johnson, more practical but less fortunate, denounced the known group of Minas Prietas, under the denominations of San Juan, Delfina, Amparo, Florencia, and Creston, and for some years, under the protection of the house of Ortiz Bros., of Hermosillo, worked them with prosperous or adverse fortune until he sold the first four for $150,000 to a rich North American Company, which immediately began to work them systematically, establishing large reduction works at a cost of more than $300,000, and in a short time took out many millions of dollars until 1891, when the interior works being carelessly destroyed by fire and the company being aware that the value of the ore had decreased, it was content to nominally preserve its property in said mines without undertaking any new work upon them, such as was necessary to put them in paying condition. Subsequently they have been purchased by the Creston-Colorada Mining Company.

The works undertaken by said North American company were to open interior communication between the two mother veins, of which the said four claims are composed, and which run parallel from east to west with an inclination of 80° to 85°, by means of a vertical shaft between the two veins to a depth of 800 feet, from which shaft start crosscuts or tunnels at every 100 feet. The thickness of the first vein is 80 feet and of the second 17 feet, with stringers of pay ore of different dimensions and an assay value of 15 ounces of gold and 10 ounces of silver per ton. Intelligent experts are of the opinion that these mines are not sufficiently exploited and that they are susceptible of producing a great fortune.

In 1886 Messrs. Chamberlain and Price (Americans from the State of Ohio), whose heirs now form the Creston-Colorada Mining Company, bought of Mr. Johnson the Creston mine, which may be considered as the extension of Minas Prietas, together with the Santa Cruz and Colorada, for the sum of $200,000. He afterwards received $500,000 in gold by way of compromise in a lawsuit he brought against said gentlemen, which gentlemen, as I have said, are now the actual holders of the principal mines of the place. The works undertaken up to the present time in these rich properties are: In the Creston, a vertical shaft which now reaches the 980-foot level, with galleries at every 100 feet, the thickness of the veins and the value of the ores being similar to those of Minas Prietas; in the Santa Cruz the works consist solely of a vertical prospecting shaft which barely reaches 200 feet, and in the Colorada an inclined shaft that measures from 800 to 900 feet on the foot wall or bed of the vein, with three levels with galleries, the first 1,100 feet, the second 900, and the third 400, with several shafts or productive works. The thickness of the vein is 6 to 8 feet, with an average value of $200 per ton, both the Creston and Colorada having powerful hoisting machinery for raising their ores, which are treated in the Prietas mill (lately remodeled) and in another no less large erected on the "Colorada claim." The management of all these works is intrusted to truly expert hands, for the present superintendent, Mr. Howell Hines, is giving this great enterprise all the push it demands, and under skillful administration the company has earned many millions of dollars.

The important mines—Amarillas, Verde, and Grand Central—are also no less rich

properties belonging to divers owners, in which systematic work has been undertaken and powerful machinery erected for treating their ores.

There are besides new mines belonging to the Union Mining Company—17 in number—covering an area of 4 leagues in circumference, in which extensive prospecting work has been done with good results. Blanca Julia and Fortuna are two prospecting shafts that now reach the depth of 150 and 200 feet with good hoisting machinery. They are being opened by a Mexican company for the purpose of cutting the principal veins that cross the district from east to west in that section and the now very important mine, La Patria, which, from a single prospect, has become a rich mine with a promising future, the ores of which pay a value of $100 gold per ton.

The prospect shaft known as Zaragoza, with a depth of 200 feet, is worthy of being mentioned on account of its promising future.

Intelligent miners, native and foreign, agree that this is one of the most important mining regions of the entire world. Many good miners, guarded by the mystery of traditional richness, awaken the cupidity of men of enterprise, who do not hesitate to risk their capital in truly colossal works of exploration or in new discoveries in this favored region. The satisfactory outcome of some of these discoveries has led to the formation of mutual companies dedicated exclusively to the development of mines.

The notable progress of the towns of Minas Prietas and La Colorada, their constant activity, the great and constant influx of people who arrive day by day in search of work or transactions of some other kind, the very expensive installations of machinery completed in a relatively short time, and others projected, prove in a striking manner that the star of progress makes its powerful influence felt by shedding everywhere its vivifying rays, and making us prophesy that the day is not far distant when this rich portion of our country will be the emporium of a great mining and commercial center.

NORWAY.

The production of gold in Norway is insignificant.

At the Kongsberg silver works, according to the information furnished by the Norwegian Government in answer to our interrogatories, argentiferous ores were extracted, from July 1, 1894, to June 30, 1895, containing an estimated amount of fine silver of 6,082 kilograms, of the coining value of $252,768, at which figure the product of Norway's silver mines in the calendar year 1895 may be placed.

PERU.

The gold product of Peru, in 1895 estimated as equal to the exports of that metal from the Republic, was 96.47 kilograms, fine, of the coining value of $64,114. There was, however, in that year, as there is in every year, some clandestine exportation, and this represents, therefore, only a portion of the gold output of the country in that year.

The silver product of Peru in 1895 is made up of the following items, officially supplied in answer to interrogatories:

	Kilograms, fine.
Deposited at the mints	98,387.734
Exported	12.970
Total	98,400.704

of the coining value of $4,089,533, at which figure Peru's output of silver in 1895 appears in the table of the world's production of the precious metals in this report.

There is a slight error in the last report of this series in the estimate made of the gold product of Peru in 1894. The estimate should be corrected thus:

	Kilograms, fine.
Deposited at the mints	100,604.316
Exported	90.695
Total	100,695.011

of the coining value of $4,184,878, at which corrected figure the silver output of Peru in 1894 appears in this report.

RUSSIA.

According to the official information received, the production of gold in Russia in 1895 was 43,478.239607 kilograms, of the value of 149,750,779.75 francs, or 37,437,694 rubles ($28,894,413), corresponding to a fine weight of 43,476 kilograms.

The product of silver was 12,108.660672 kilograms, of the value of 2,691,385 francs (French coining value), or 672,846 rubles, representing a coining value of $519,303, corresponding to a fine weight of 12,495 kilograms.

The following account of the gold production of Russia is by Dr. Hauchecorne, and constitutes part of the paper laid by him before the Berlin Silver Commission on "The production of gold and silver."

The gold production of Russia took its rise toward the middle of the last century in the region which since then has remained the most important for the Russian metal-mining industry, in the Ural, and in particular in the East Ural portion of the government of Perm, in the region of Yekaterinboorg, where in 1745 the deposits of Berezofsk, 12 kilometers (7.4 miles) northeast of Yekaterinboorg, were discovered.

At that point, in old crystalline schists (talc, chloritic, and clay schists), there occurred vast veins of a fine-grained granite, poor in feldspar, distinguished as beresite, and characterized by a high content of sulphur pyrite. It is traversed by feeble quartz veins, which carry the gold.

Similar occurrences of quartz veins were afterwards discovered at Miask and at Troitsk, south of Yekaterinboorg, and their exploitation was begun.

Other workable occurrences of gold in the rock of this region belong to diorite veins and serpentines, as, for example, that in the valley of Salimonov near Kyshtim.

A very successful gold and silver mining industry was also begun in the Altai Mountains, in the government of Tomsk, on lodes occurring in crystalline schists and in Silurian, Devonian, and Carboniferous strata.

The importance of this lode-mining industry, whose principal locality is the Snake Mountain near Smeinogorsk, has greatly diminished in recent time.

In fact, in the case of the Russian gold production, mining operations are of relatively small importance as compared to the production from gold gravels.

This is true, first of all, of the Ural region itself, which in its valleys, especially on the east side, contains numerous important gold gravel deposits, and this over the whole extent from Bogoslovsk, in about 60° north latitude, to the region of the Orenboorg Cossacks, in 52° north latitude. Bogoslovsk, Goroblagodatsk, Nizhnee, Taghilsk, Bizersk, Berezovsk, Kyshtimsk, Miask, Troitsk, and Katchgar are known as rich localities.

The thickness of the gold-bearing alluviums occurring there in general is not large, being on an average one-half to 1 meter (1.6 feet to 3.2 feet), exceptionally rising to 4 meters (13.1 feet). They are covered by barren material, on the thickness

of which, as compared to the gold contents of the alluvial deposits, the possibility of exploitation depends.

The gold content is there said to be on an average about 1.3 grams per ton of ore, and, in general, permits a paying industry in most of the washings. Of greater importance still than the Ural alluvial gold washings are those of Siberia; first, West Siberia, with the government of Tomsk and the Altai Mountains, but especially East Siberia, with the governments of Yeniseisk, Irkutsk, Yakutsk; in the latter, especially south of the Lena, between the rivers Vitim and Olekma, where, among others, very considerable washings are carried on near Olekminsk; also in Transbaikalia (Nerchinsk), and recently, with especially great success, in the Amur region.

In recent time new gold gravels have also been discovered east of Yakutsk, on the Amgun River, between the Lena and Aldan rivers.

The development of the gold-washing industry in Siberia progressed from west to east, from the Ural first into West Siberia and then advancing farther and farther into East Siberia.

It may further be mentioned that paying gold gravels are also known to exist in the part of Turkestan recently acquired by Russia, in the river basins of the Syr Darya and the Ili (near Kuldja).

The following table gives a summary of the total production of Russia, with the addition of the masses of the worked-up raw material of the washings, as well as of the worked-up ore of the mines, the resulting average gold content, as well as the number of workmen employed and of the works in operation. Like all the following statistical data, it is taken from H. Mayer's paper on "Coinage matters and precious-metal production of Russia," which derived them from the statistics of the Russian mining industry by Kulibin. The weights have been converted into kilograms.

Year.	Total product.		Washed sand and quartz, in millions of puds.	Average contents in—			Number of workmen employed.	Number of works in operation.
				100 puds sand.		1,000 kilograms sand.		
	Puds.	*Kilograms.*		*Dolis.*	*Grams.*	*Grams.*		
1880	2,644	43,308	1,300,000	77	3.42	2.08	87,337	1,306
1881	2,244½	36,761	1,177,000	73	3.24	1.97	82,102	1,306
1882	2,207	36,151	1,127,000	72	3.19	1.94	(?)	1,226
1883	2,181½	35,733	1,166,000	69	3.06	1.88	73,701	1,292
1884	2,178	35,676	1,200,000	69⅛	3.10	1.89	76,465	1,306
1885	2,015⅛	33,010	1,164,000	64	2.84	1.73	75,384	1,363
1886	2,041½	33,437	1,239,000	60½	2.68	1.64	73,612	1,446
1887	2,128½	34,862	1,350,000	58	2.57	1.57	82,237	1,681
1888	2,146⅛	35,164	1,352,000	58½	2.61	1.59	84,256	1,790
1889	2,274½	37,256	1,370,000	62	2.75	1.68	84,562	1,824
1890	2,403½	39,380	1,415,000	63½	2.82	1.72	82,108	1,742
1891	2,500	40,951	.....	.....	.....	.....	.....	.....

It should be remarked that the figures of the total production are notably higher than those from the statements of the United States Director of the Mint, or, respectively, of the Mineral Industry of Rothwell, as shown by the subjoined Table 1.

As Kulibin's tables are taken from official material in St. Petersburg, they may be regarded as more correct.

The above table shows in general a fall from 1880 to 1885, and then a rise to the end of 1891.

The total production includes also the output of the subterranean mining industry

in the Ural and in Siberia, including the Altai. That output, in detail, reached the following amounts in 1882–1890:

Year.	In Siberia.	In the Ural.
	Ounces.	*Ounces.*
1882	5,079	31,960
1883	5,015	40,734
1884	10,513	37,519
1885	9,966	48,032
1886	17,586	53,304
1887	17,553	68,672
1888	12,377	78,220
1889	13,535	77,095
1890	12,602	80,632

Thus it appears that the production of the mines, especially in the Ural region, has steadily risen from a total of 1,149 kilograms to 2,900 kilograms, or in the proportion to the total production from 2.65 per cent in 1882 to 7.36 per cent in 1890. In any case, however, it constitutes but a very small part of the total production.

The share which the various districts have in the total production is shown in the subjoined Table. From that table it appears that by far the largest share—in 1890 it was 25,895 kilograms (832,524 ounces) out of 36,307 kilograms (1,167,270 ounces)—belongs to the more recent industry in East Siberia. It furthermore appears that in this latter region, too, only the last-opened gold fields of the Amur district and of the other new districts of the east show a considerable rise in the output, while in all the other districts there has been a great falling off.

Thus the gold production of Russia exhibits the same process that took place also in the other countries rich in gold. The exhaustion of the gold gravel deposits by a method practicable without a great outlay of effort, capital, and intelligence, impels the promoters to seek a substitute for the decreasing profit, and thus the industry gradually progresses into new districts, until the limits of the deposits or a natural boundary is reached, in this case the sea. In other gold lands, easy of access, this process has been passed through rapidly. In Asiatic Russia, on the other hand, it is very much retarded by various difficulties of transportation, of conditions of industry and labor, of the procuring of capital, and to a notable degree also by the rigor of the climate.

But while in the most important of the other gold lands the exhaustion of the gravel beds was immediately followed by the search for the original sites and their development, and a vigorous mining industry sprang up on these, no important gold mines have yet been developed in the Siberian districts, although from the nature of the country rock and the richness of the gold gravels the existence of paying lodes can not be doubted.

Under these circumstances the gold production of Russia is for the present dependent in the main on the continuance of the alluvial gold gravels. In view of the wide distribution of the known gold gravel areas, and in view of the above-mentioned conditions which hamper and retard the exploitation, a long continuance of the Russian gold production may certainly be expected, and in view of the immense extent of the Russian Empire in Asia it may be assumed that new deposits of that kind will be discovered.

There can be no doubt, however, that these gravels will be eventually exhausted, and that in this way the Russian contribution to the gold supply of the earth will vanish, unless subterranean gold deposits are opened. The zeal with which in recent time the accurate geologic examination of the Asiatic regions, and in particular of the conditions of ore deposits, has been undertaken by the geologic committee at St. Petersburg, will be of the greatest utility for the attainment of that end.

The silver production of Russia is unimportant. Its most important center is the mining industry on the lodes of the Altai Mountains, which contain silver ores, together with silver-bearing lead ores, copper ores, and zinc ores, as well as native gold. The operations on more recent discoveries in the district of Nerchinsk, in the Turai region of the Kirghise steppe, and in the Caucasus have not thus far led to any notable result.

The production in 1890 was in all 14,600 kilograms (469,390 ounces), of which 11,200 kilograms (360,080 ounces) came from the Altai mines.

SPAIN.

Spain produces no gold.

The official information received relative to the silver yield of Spain in 1895, is as follows:

	Kilograms.
Production of mines from silver ores, properly called pure silver	10,268
From silver-lead ores, 181,438 tons, containing with an average of 430 grams silver per ton	78,016
From iron-silver ores	115
From lead ores, 85,621 tons, containing with an average of 250 grams silver per ton	21,405
Total pure silver corresponding to the production of silver ores in 1895.	109,804

of the coining value of $4,563,454.

SWEDEN.

According to the information furnished in answer to interrogatories, the production of gold in Sweden in 1895 was 78.59 kilograms, fine, of the value of $52,231, and the production of silver 1,186.84 kilograms, of the coining value of $49,325.

URUGUAY.

From the information furnished by the Government of Uruguay in answer to interrogatories, the commercial value of the rough gold extracted from the mines of Uruguay in 1895 was $27,041.32, which represents 40.7 kilograms, fine, at which figure the gold output of that country is placed in the table of the world's production of gold and silver. No silver mines are worked in Uruguay.

VENEZUELA.

No information has been received relative to the production of the precious metals in Venezuela during the year 1895.

The gold product of that country in 1895 is assumed to have been the same as in 1894.

PART III.

GENERAL STATISTICS.

I.—DEPOSITS AND PURCHASES OF GOLD AND SILVER, BY WEIGHT,

Description of deposit.	COINAGE MINTS.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
GOLD.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
Domestic bullion, unrefined	27,396.017	241,628.838	35,422.608	173.035
Domestic bullion, refined	29,918.812	878,637.882	.....	.....
Domestic coin transferred from Treasury	11,754.970	.....	.....	.....
Domestic coin mutilated and abraded	12,763.338	1,053.515	.....	855.081
Foreign bullion, unrefined	2,864.330	30,223.252	.....	7,764.998
Foreign bullion, refined	.....	.....	.....	.....
Foreign coin melted	79.672	31,851.868	.....	399.151
Jewelers' bars, old plate, etc	47,185.318	1,786.658	.....	3,595.006
Total deposits	131,962.457	1,185,182.013	35,422.608	12,787.271
Redeposits:				
Fine bars	1,080,688.903	14,362.346	.....	.....
Unparted bars	423,295.569	41,189.826	.....	.....
Total gold received	1,635,946.929	1,240,734.185	35,422.608	12,787.271
SILVER.				
Domestic bullion, unrefined	1,704.73	41,720.84	181,828.72	40.52
Domestic bullion, refined	803,741.18	.....	.....	.....
Domestic coin transferred from Treasury	1,536,116.87	154,354.57	.....	1,310,696.50
Domestic coin worn and uncurrent	1,350.21	101.30	.....	500.33
Trade dollars, uncurrent	290.17	.....	.....	.87
Foreign bullion, unrefined	2,196.33	10,340.28	.....	1,253.11
Foreign coin melted	.....	.....	.....	.....
Jewelers' bars, old plate, etc	59,063.47	601.06	.....	2,642.50
Total deposits	2,404,462.96	207,118.05	181,828.72	1,315,133.83
Redeposits:				
Fine bars	69,471.58	.....	.....	.....
Unparted bars	103,582.53	178,879.94	.....	.....
Total silver received	2,577,517.07	385,997.99	181,828.72	1,315,133.83
Gold and silver deposits and purchases	2,536,425.417	1,392,300.063	217,251.328	1,327,921.101
Redeposits:				
Gold	1,503,984.472	55,552.172	.....	.....
Silver	173,054.11	178,879.94	.....	.....
Total gold and silver received	4,213,463.999	1,626,732.175	217,251.328	1,327,921.101

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena	Charlotte.	St. Louis.	
Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
231,489.068	143,823.654	52,674.474	121,536.779	14,783.518	669.124	869,541.115
807,120.746	84,041.610	.....	.....	.....	271.933	1,799,990 983
.....	.....	.....	.....	.....	.....	11,754.970
32,093.427	14.364	.....	.....	.....	531.245	47,310.970
93,152.064	281.394	.....	2,488.961	.....	498.755	137,273.754
619,424.092	.....	.....	.....	.....	.....	619,424.092
30,669.157	30.785	.....	.....	.....	.....	63,030.633
126,610.654	1,282.946	....	107.620	130.479	3,029.698	183,728.879
1,940,559,208	229,474.753	52,674.474	124,127.360	14,863.997	5,000.755	3,732,054.896
123,596.634	.....	.....	.....	.....	.....	1,218,647.883
647.720	587.443	12,918.331	2,124.367	.....	17.890	480,781.146
2,064,803.562	230,062.196	65,592.805	126,251.727	14,863.997	5,018.645	5,431,483.925
289,706.63	42,540.17	15,769.47	43,795.92	1,050.09	29.60	618,186.69
5,658,804.34	1,023.70	.....	.....	.....	.....	6,463,569.22
.....	.....	.....	.....	.....	.....	3,001,167.94
2,070.91	.....	.....	.....	.....	.....	4,022.75
74.38	.....	.....	.....	.....	.....	365.42
1,060,677.10	35.94	.....	1,098.27	.....	59.81	1,075,660.84
63,135.60	.13	....	.....	.....	.....	63,135.73
606,961.74	375.99	.....	28.09	39.52	1,034.13	670,766.50
7,681,450.70	43,975 93	15,769.47	44,922.28	1,089.61	1,123.54	11,896,875.09
5,769.86	.....	.....	.....	.....	.....	75,241.44
1,172.29	550 74	2,942.94	749.89	.....	3.64	287,981.97
7,688,392.85	44,526.67	18,712.41	45,672.17	1,089.61	1,127.18	12,259,998.50
9,622,009.908	273,450.683	68,443.944	169,049.640	15,953.607	6,124.295	15,628,929.986
124,244.354	587.443	12,918.331	2,124.367	.....	17.890	1,699,429.029
6,942.15	550.74	2,942.94	749.89	.....	3.64	363,123.41
9,753,196.412	274,588.866	84,305.215	171,923.897	15,953.607	6,145.825	17,691,482.425

II.—Deposits and Purchases of Gold and Silver, by Value,

Description of deposit.	Coinage Mints.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
GOLD.				
Domestic bullion, unrefined	$509,693.34	$4,495,420.24	$659,025.26	$3,219.26
Domestic bullion, refined	556,629.06	16,346,751.29		
Domestic coin transferred from Treasury	218,697.11			
Domestic coin mutilated and abraded	237,457.46	19,600.28		15,908.48
Foreign bullion, unrefined	53,289.86	562,293.06		144,465.08
Foreign bullion, refined				
Foreign coin melted	1,482.27	592,592.89		7,426.07
Jewelers' bars, old plate, etc	877,866.38	33,240.15		68,883.83
Total deposits	2,455,115.48	22,049,897.91	659,025.26	237,902.72
Redeposits:				
Fine bars	20,105,840.05	267,206.44		
Unparted bars	7,875,266.40	766,322.34		
Total gold received	30,436,221.93	23,083,426.69	659,025.26	237,902.72
SILVER.				
Domestic bullion, unrefined	1,983.69	48,547.88	211,582.50	47.15
Domestic bullion, refined	935,262.46			
Domestic coin transferred from Treasury	1,787,481.45	179,612.59		1,525,174.11
Domestic coin worn and uncurrent	1,571.15	117.88		582.20
Trade dollars, uncurrent	337.65			1.01
Foreign bullion, unrefined	2,555.73	12,032.33		1,458.16
Foreign coin melted				
Jewelers' bars, old plate, etc	68,728.40	699.41		3,074.91
Total deposits	2,797,920.53	241,010.09	211,582.50	1,530,337.54
Redeposits:				
Fine bars	80,839.66			
Unparted bars	120,532.40	208,151.20		
Total silver received	2,999,292.59	449,161.29	211,582.50	1,530,337.54
Gold and silver deposits and purchases	5,253,036.01	22,290,908.00	870,607.76	1,768,240.26
Redeposits:				
Gold	27,981,106.45	1,033,528.78		
Silver	201,372.06	208,151.20		
Total gold and silver received	33,435,514.52	23,532,587.98	870,607.76	1,768,240.26

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
$4, 306, 773. 36	$2, 675, 788. 91	$979, 990. 21	$2, 261, 037. 74	$274, 111. 96	$12, 448. 82	$16, 177, 509. 10
15, 016, 199. 92	1, 563, 564. 84	.....	.....	.....	5, 059. 22	33, 488, 204. 33
.....	.....	.....	.....	.....	.....	218, 697. 11
597, 087. 02	267. 24	.....	.....	.....	9, 883. 63	880, 204. 11
1, 733, 061. 66	5, 235. 24	.....	46, 306. 25	.....	9, 279. 16	2, 553, 930. 31
11, 524, 169. 15	.....	.....	.....	.....	.....	11, 524, 169. 15
570, 588. 96	572. 74	.....	.....	.....	.....	1, 172, 662. 93
2, 355, 547. 05	23, 868. 76	.....	2, 002. 23	2, 427. 52	56, 366. 47	3, 418, 202. 89
36, 103, 427. 12	4, 269, 297. 73	979, 990. 21	2, 309, 346. 22	276, 539. 48	93, 037. 30	69, 433, 579. 43
2, 299, 472. 26	.....	.....	.....	.....	.....	22, 672, 518. 75
12, 050. 60	10, 929. 17	240, 341. 04	39, 523. 10	.....	332. 84	8, 944, 765. 49
38, 414, 949. 98	4, 280, 226. 90	1, 220, 331. 25	2, 348, 869. 32	276, 539. 48	93, 370. 14	101, 050, 863. 67
337, 113. 18	49, 501. 29	18, 349. 91	50, 962. 52	1, 221. 92	34. 44	719, 344. 48
6, 584, 790. 51	1, 191. 21	.....	.....	.....	.....	7, 521, 244. 18
.....	.....	.....	.....	.....	.....	3, 492, 268. 15
2, 409. 79	.....	.....	.....	.....	.....	4, 681. 02
86. 55	.....	.....	.....	.....	.....	425. 21
1, 234, 242. 44	41. 82	.....	1, 277. 98	.....	69. 60	1, 251, 678. 06
73, 466. 88	. 15	.....	.....	.....	.....	73, 467. 03
706, 306. 02	437. 51	.....	33. 69	45. 99	1, 203. 35	780, 528. 28
8, 938, 415. 87	51, 171. 98	18, 349. 91	52, 273. 19	1, 267. 91	1, 307. 39	13, 843, 636. 41
6, 714. 02	.....	.....	.....	.....	.....	87, 553. 68
1, 364. 12	640. 86	3, 424. 51	872. 60	.....	4. 23	334, 989. 92
8, 946, 493. 51	51, 812. 84	21, 774. 42	53, 145. 79	1, 267. 91	1, 311. 6_2	14, 266, 180. 01
45, 041, 842. 49	4, 320, 469. 71	998, 340. 12	2, 361, 619. 41	277, 807. 39	94, 344. 69	83, 277, 215. 84
2, 311, 522. 86	10, 929. 17	240, 341. 04	39, 523. 10	.....	332. 84	31, 617, 284. 24
8, 078. 14	640. 86	3, 424. 51	872. 60	.....	4. 23	422, 543. 60
47, 361, 443. 49	4, 332, 039. 74	1, 242, 105. 67	2, 402, 015. 11	277, 807. 39	94, 681. 76	115, 317, 043. 68

III.—DEPOSITS OF UNREFINED GOLD OF DOMESTIC PRODUCTION, WITH THE STATES NOT DISTRIBUTED, BY WEIGHT, DURING THE

Source.	COINAGE MINTS.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
	Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
Alabama	10.483			145.665
Alaska	77.070	15,892.483		
Arizona	851.337	35,141.744		
California	252.987	166,520.052	6,471.298	
Connecticut				
Colorado	9,282.289	24.638		
Georgia	786.064			13.121
Idaho	436.617	4,720.500		
Michigan	59.979			
Minnesota	8.574			
Montana	17.132	102.166		
Nebraska	22.493			
Nevada		3,999.212	28,534.158	
New Mexico	35.158	207.106		1.852
North Carolina	217.867			
Oregon	13.474	7,498.074	117.157	
South Carolina	295.536			
South Dakota	14,645.392			
Tennessee	11.007			
Texas				12.397
Utah	23.079	3,119.765		
Virginia	191.029			
Washington	14.256	4,389.613		
Wyoming	32.134			
Other sources	612.060	13.485		
Total unrefined gold	27,396.017	241,628.838	35,422.608	173.035
Refined gold	29,918.812	878,637.882		
Total gold	57,314.829	1,120,266.720	35,422.608	173.035

AND TERRITORIES PRODUCING THE SAME, AND OF REFINED DOMESTIC BULLION, CALENDAR YEAR ENDED DECEMBER 31, 1895.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
.....	.....	.....	.....	.....	.....	156.148
34.903	8.809	.....	2,810.107	.....	.....	18,823.372
3,550.790	2,890.202	.....	.....	.....	18.020	41,952.093
106.739	24.123	.....	.....	.....	19.634	173,394.828
6.763	.....	.....	.....	.....	.....	6.763
10,814.126	122,830.611	.....	240.567	.....	9.382	143,201.613
74.654	.....	.....	.....	6,006.398	.....	6,880.237
4,621.664	746.870	32,083.582	14,245.817	.....	45.481	56,900.531
1,890.418	.....	.....	.....	.....	.....	1,950.397
.....	.....	.....	.....	.....	.....	8.574
21,399.666	150.753	.....	97,085.549	.....	7.274	118,712.540
.....	.....	.....	.....	.....	.....	22.498
23,245.805	339.637	.....	.....	.....	.....	56,418.812
4,712.578	7,952.465	.....	253.755	.....	569.333	13,732.247
575.879	.....	.....	.....	2,117.379	.....	2,911.125
18.050	115.257	20,590.892	1,084.979	.....	.....	29,437.883
.....	.....	.....	.....	6,605.666	.....	6,901.202
152,714.803	3,449.765	.....	25.011	.....	.....	170,834.971
6.968	.....	.....	.....	.....	.....	17.975
.....	.....	.....	.....	.....	.....	12.397
2,696.639	3,958.778	.....	.....	.....	.....	9,798.261
1.596	.....	.....	.....	4.075	.....	196.700
.....	5.746	.....	5,784.676	.....	.....	10,194.291
30.962	1,350.638	.....	50.318	.....	.....	1,464.052
4,986.065	.....	.....	.....	.....	.....	5,611.610
231,489.068	143,823.654	52,674.474	121,530.779	14,733.518	669.124	869,541.115
807,120.746	84,041.610	.....	.....	.....	271.933	1,799,990.983
1,038,609.814	227,865.264	52,674.474	121,530.779	14,733.518	941.057	2,669,532.098

IV.—DEPOSITS OF UNREFINED GOLD OF DOMESTIC PRODUCTION, WITH THE STATES NOT DISTRIBUTED, BY VALUE, DURING THE

Source.	COINAGE MINTS.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
Alabama	$195.03			$2,710.05
Alaska	1,433.86	$295,674.10		
Arizona	6,536.50	653,799.89		
California	4,706.74	3,098,047.48	$120,396.15	
Connecticut				
Colorado	172,693.75	458.38		
Georgia	14,624.45			244.11
Idaho	8,123.11	87,823.26		
Michigan	1,115.89			
Minnesota	159.52			
Montana	318.73	1,900.76		
Nebraska	418.47			
Nevada		74,403.95	536,449.45	
New Mexico	654.10	3,853.13		34.46
North Carolina	4,053.34			
Oregon	250.68	139,499.05	2,179.66	
South Carolina	5,498.34			
South Dakota	272,472.41			
Tennessee	204.78			
Texas				230.64
Utah	429.38	58,042.14		
Virginia	3,554.03			
Washington	265.23	81,667.22		
Wyoming	597.84			
Other sources	11,387.16	250.88		
Total unrefined gold	509,693.34	4,495,420.24	659,025.26	3,219.26
Refined gold	556,629.06	16,346,751.29		
Total gold	1,066,322.40	20,842,171.53	659,025.26	3,219.26

AND TERRITORIES PRODUCING THE SAME, AND OF REFINED DOMESTIC BULLION, CALENDAR YEAR ENDED DECEMBER 31, 1895.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
.....	.....	.....	.....	.....	.....	$2,905.08
$649.36	$163.89	.....	$52,281.06	.....	.....	350,202.27
66,061.21	53,771.20	.....	.....	.....	$335.26	780,504.06
1,985.84	448.80	.....	.....	.....	365.28	3,225,950.29
125.82	.....	.....	.....	.....	.....	125.82
201,193.04	2,285,220.67	.....	4,475.06	.....	174.55	2,664,216.05
1,388.91	.....	.....	.....	$111,746.94	.....	128,004.41
85,984.44	13,895.26	$596,903.85	265,038.46	.....	846.16	1,058,614.54
35,170.57	.....	.....	.....	.....	.....	36,286.46
.....	.....	.....	.....	.....	.....	159.52
398,133.32	2,804.70	.....	1,805,312.54	.....	135.33	2,208,605.38
.....	.....	.....	.....	.....	.....	418.47
432,480.10	6,318.83	.....	.....	.....	.....	1,049,652.33
87,675.87	147,952.84	.....	4,721.02	.....	10,592.24	255,483.66
10,714.03	.....	.....	.....	39,393.09	.....	54,160.46
335.81	2,144.32	383,086.36	20,185.65	.....	.....	547,681.53
.....	.....	.....	.....	122,896.12	.....	128,394.46
2,841,205.64	64,181.67	.....	465.32	.....	.....	3,178,325.04
129.64	.....	.....	.....	.....	.....	334.42
.....	.....	.....	.....	.....	.....	230.64
50,170.03	73,651.68	.....	.....	.....	.....	182,293.23
29.69	.....	.....	.....	75.81	.....	3,659.53
.....	106.90	.....	107,621.88	.....	.....	189,661.23
576.04	25,128.15	.....	936.15	.....	.....	27,238.18
92,764.00	.....	.....	.....	.....	.....	104,402.04
4,306,773.36	2,675,788.91	979,990.21	2,261,037.74	274,111.96	12,448.82	16,177,509.10
15,016,199.92	1,563,564.84	.....	.....	.....	5,059.22	33,488,204.33
19,322,973.28	4,239,353.75	979,990.21	2,261,037.74	274,111.96	17,508.04	49,665,713.43

V.—Deposits of Unrefined Silver of Domestic Production, with the Bullion not Distributed, by Weight, during the

Source.	Coinage Mints.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
	Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
Alabama	0.33			35.95
Alaska	15.13	3,120.65		
Arizona	422.36	8,948.73		
California	85.18	24,870.98	5,778.03	
Colorado	262.04	2.80		
Georgia	29.68			1.15
Idaho	310.34	1,201.67		
Michigan	165.21			
Minnesota	1.93			
Montana	7.35	8.71		
Nevada		1,148.14	176,016.32	
New Mexico	9.93	67.36		2.42
North Carolina	57.76			
Oregon	2.76	1,284.96	34.37	
South Carolina	76.03			
South Dakota	136.45			
Tennessee	.55			
Utah	2.28	325.93		
Virginia	11.26			
Washington	3.73	737.70		
Wyoming	2.67			
Other sources	101.16	3.19		
Total unrefined silver	1,704.73	41,720.84	181,828.72	40.52
Refined silver	803,741.18			
Total silver	805,445.91	41,720.84	181,828.72	40.52

STATES AND TERRITORIES PRODUCING THE SAME, AND OF REFINED DOMESTIC CALENDAR YEAR ENDED DECEMBER 31, 1895.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
.....	.....	.....	.....	.....	.....	36.28
5.57	1.82	.....	512.82	.....	.....	3,655.99
1,444.96	1,131.41	.....	.....	.....	3.67	11,951.13
7.39	3.19	.....	.....	.....	6.86	30,751.63
41,771.08	39,594.73	.....	59.61	.....	3.20	81,694.06
14.30	.....	.....	.....	369.18	.....	414.31
918.93	92.96	12,173.52	3,479.19	.....	8.19	18,184.80
35,096.77	.....	.....	.....	.....	.....	35,261.98
.....	.....	.....	.....	.....	.....	1.93
87,849.72	21.46	.....	37,041.58	.....	4.37	124,933.19
447.71	21.27	.....	.....	.....	.....	177,633.44
42,560.56	925.69	.....	123.71	.....	3.31	43,693.98
43.63	.....	.....	.....	318.87	.....	420.26
2.83	19.06	3,595.95	510.03	.....	.....	5,449.98
.....	.....	.....	.....	361.59	.....	437.62
38,452.19	344.73	.....	2.66	.....	.....	38,936.08
.35	.....	.....	.....	.....	.....	.90
6,825.25	192.22	.....	.....	.....	.....	7,345.68
.45	.....	.....	.....	.45	.....	12.16
.....	.95	....	2,063.03	.....	.....	2,805.41
1.82	190.68	.....	3.29	.....	.....	198.46
34,263.12	.....	.....	.....	.....	.....	34,367.47
289,706.63	42,540.17	15,769.47	43,795.92	1,050.09	29.60	618,186.69
5,658,804.34	1,023.70	.....	.....	.....	.....	6,463,569.22
5,948,510.97	43,563.87	15,769.47	43,795.92	1,050.09	29.60	7,081,755.91

VII.—DEPOSITS OF UNREFINED SILVER OF DOMESTIC PRODUCTION, WITH THE BULLION NOT DISTRIBUTED, BY VALUE, DURING THE

Source.	COINAGE MINTS.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
Alabama	$0.39			$41.83
Alaska	17.61	$3,631.30		
Arizona	491.47	10,413.07		
California	99.12	28,940.78	$6,723.52	
Colorado	305.62	3.26		
Georgia	34.54			1.34
Idaho	361.12	1,398.31		
Michigan	192.25			
Minnesota	2.25			
Montana	8.55	10.13		
Nevada		1,336.02	204,818.99	
New Mexico	11.55	78.38		.96
North Carolina	67.21			
Oregon	3.21	1,495.25	39.99	
South Carolina	88.47			
South Dakota	158.78			
Tennessee	.64			
Utah	2.65	379.26		
Virginia	13.10			
Washington	4.34	858.41		
Wyoming	3.11			
Other sources	117.71	3.71		
Total unrefined silver	1,983.69	48,547.88	211,582.50	47.15
Refined silver	935,262.46			
Total silver	937,246.15	48,547.88	211,582.50	47.15

STATES AND TERRITORIES PRODUCING THE SAME, AND OF REFINED DOMESTIC CALENDAR YEAR ENDED DECEMBER 31, 1895.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
.....	.....	.....	.....	.....	.....	$42.22
$6.48	$2.12	.....	$596.74	.....	.....	4,254.25
1,681.41	1,316.54	.....	.....	.....	$4.27	13,906.76
8.60	3.71	.....	.....	.....	7.98	35,783.71
48,606.35	46,073.86	.....	69.36	.....	3.72	95,062.17
16.64	.....	.....	.....	$429.59	.....	482.11
1,069.30	108.17	$14,165.54	4,048.51	.....	9.53	21,160.48
40,839.88	.....	.....	.....	.....	.....	41,032.13
.....	.....	.....	.....	.....	.....	2.25
102,225.12	24.97	.....	43,102.93	.....	5.09	145,376.79
520.97	24.75	.....	.....	.....	.....	206,700.73
49,525.02	1,077.17	.....	143.95	.....	3.85	50,843.90
50.77	.....	.....	.....	371.05	.....	489.03
3.29	22.18	4,184.37	593.49	.....	.....	6,341.78
.....	.....	.....	.....	420.76	.....	509.23
44,744.37	401.14	.....	3.10	.....	.....	45,307.39
.41	.....	.....	.....	.....	.....	1.05
7,942.11	223.69	.....	.....	.....	.....	8,547.71
.52	.....	.....	.....	.52	.....	14.14
.....	1.11	.....	2,400.61	.....	.....	3,284.47
2.12	221.88	.....	3.83	.....	.....	230.94
39,869.82	.....	.....	.....	.....	.....	39,991.24
337,113.18	49,501.29	18,349.91	50,962.52	1,221.92	34.44	719,344.48
6,584,790.51	1,191.21	.....	.....	.....	.....	7,521,244.18
6,921,903.69	50,692.50	18,349.91	50,962.52	1,221.92	34.44	8,240,588.66

VII.—BARS MANUFACTURED OF GOLD AND SILVER, BY WEIGHT,

Description.	COINAGE MINTS.			
	Philadelphia.	San Francisco.	Carson	New Orleans.
GOLD.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
Fine bars	50,968.010		14,362.346	8.184
Mint bars				
Standard bars				
Unparted bars				
Total gold	50,968.010		14,362.346	8.184
SILVER.				
Fine bars	41,636.96		180,231.36	1,192.20
Mint bars				
Standard bars				
Unparted bars				
Total silver	41,636.96		180,231.36	1,192.20

VIII.—BARS MANUFACTURED OF GOLD AND SILVER, BY VALUE,

Description.	COINAGE MINTS.			
	Philadelphia.	San Francisco.	Carson.	New Orleans.
GOLD.				
Fine bars	$948,242.05		$267,206.44	$152.26
Mint bars				
Standard bars				
Unparted bars				
Total gold	948,242.05		267,206.44	152.26
SILVER.				
Fine bars	48,450.28		209,723.76	1,387.29
Mint bars				
Standard bars				
Unparted bars				
Total silver	48,450.28		209,723.76	1,387.29
Total value of gold and silver bars	996,692.33		476,930.20	1,539.55

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
Standard ozs.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
1,898,046.349	15,336.110	.....	.....	.....	.....	1,978,720.999
162,246.707	.....	.....	.....	.....	.....	162,246.707
14,490.729	.....	.....	.....	.....	.....	14,490.729
1,055.905	214,726.086	65,592.805	126,251.727	14,863.997	5,018.645	427,509.165
2,075,839.690	230,062.196	65,592.805	126,251.727	14,863.997	5,018.645	2,582,967.600
7,456,837.77	.....	.....	.....	.....	.....	7,679,898.29
69,462.76	.....	.....	.....	.....	.....	69,462.76
.....	.....	.....	.....	.....	.....	.....
292,817.49	44,526.67	18,712.41	45,672.17	1,089.61	1,127.18	403,945.53
7,819,118.02	44,526.67	18,712.41	45,672.17	1,089.61	1,127.18	8,153,300.58

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

ASSAY OFFICES.						Total.
New York.	Denver.	Boise.	Helena.	Charlotte.	St. Louis.	
$35,312,490.21	$285,322.98	.....	.....	.....	.....	$36,813,413.94
3,018,543.39	.....	.....	.....	.....	.....	3,018,543.39
269,594.96	.....	.....	.....	.....	.....	269,594.96
19,644.74	3,994,903.92	$1,220,331.25	$2,348,869.32	$276,539.48	$93,370.14	7,953,658.85
38,620,273.30	4,280,226.90	1,220,331.25	2,348,869.32	276,539.48	93,370.14	48,055,211.14
8,677,047.59	.....	.....	.....	.....	.....	8,936,608.92
80,829.39	.....	.....	.....	.....	.....	80,829.39
.....	.....	.....	.....	.....	.....	.....
340,733.08	51,812.84	21,774.42	53,145.79	1,267.91	1,311.62	470,045.66
9,098,610.06	51,812.84	21,774.42	53,145.79	1,267.91	1,311.62	9,487,483.97
47,718,883.36	4,332,039.74	1,242,105.67	2,402,015.11	277,807.39	94,681.76	57,542,695.11

IX.—STATEMENT OF DOMESTIC MUTILATED AND UNCURRENT GOLD AND SILVER FOR RECOINAGE, SHOWING WEIGHT, FACE VALUE, COINING VALUE,

Denominations.	PHILADELPHIA.		SAN FRANCISCO.	
	Received from Treasury.	Purchased.	Received from Treasury.	Purchased.
GOLD.	*Face value.*	*Face value.*	*Face value.*	*Face value.*
Double eagles	$101,860.00	$97,200.00	.....	$17,300.00
Eagles	48,460.00	51,920.00	.....	1,130.00
Half eagles	68,730.00	81,855.00	.....	2,785.00
Three-dollar pieces	.....	93.00	.....	6.00
Quarter eagles	895.00	7,520.00	.....	195.00
Dollars	1.00	412.00	.....	61.00
Total gold, face value	219,946.00	239,000.00	.....	21,477.00
SILVER.				
Trade dollar	.....	334.00	.....	.....
Standard dollars	15,000.00	649.00	.....	.....
Half dollars	547,124.00	487.00	$151,000.00	50.50
Quarter dollars	981,956.00	364.25	43,000.00	44.75
Twenty-cent pieces	253.80	.40	3.60	.30
Dimes	478,985.00	158.40	6,000.00	41.70
Half dimes	3,354.20	16.75	93.95	2.10
Three-cent pieces	279.23	2.58	12.00	.....
Total silver, face value	2,026,952.23	2,012.38	200,109.55	139.25
SUMMARY.	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*	*Standard ozs.*
Gold coin	11,754.970	12,763.338	.....	1,053.515
Silver coin	1,536,116.87	1,640.38	154,354.57	101.30
Gold, coining value	$218,697.11	$237,457.46	.....	$19,600.28
Silver, subsidiary, coining value	1,911,187.39	2,040.91	$192,043.00	126.63
Silver dollar, coinage value	1,787,481.45	1,908.80	179,612.59	117.88
Loss, gold	1,248.89	1,542.54	.....	1,876.72
Loss, silver, subsidiary	115,764.84	.....	8,066.55	13.22
Gain, silver, subsidiary	.....	28.53	.....	.....
Net loss	.....	.....	.....	.....

	GOLD COINS.			SILVER COINS.		
	Face value.	Fine ounces.	Coining value.	Face value.	Fine ounces.	Subsidiary coining value.
Received from Treasury	$219,946.00	10,579.473	$218,697.11	$3,942,761.78	2,701,051.15	$3,733,956.97
Received over the counter	889,795.50	42,579.873	880,204.11	5,768.83	3,949.35	5,459.62
Total	1,109,741.50	53,159.346	1,098,001.22	3,948,530.61	2,705,000.50	3,739,416.59

COINS TRANSFERRED FROM THE TREASURY AND PURCHASED OVER THE COUNTER AND LOSS DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

NEW ORLEANS.		NEW YORK.	DENVER.	ST. LOUIS.	TOTAL.		
Received from Treasury.	Purchased.	Deposited.	Deposited.	Deposited.	Received from Treasury.	Purchased and deposited.	Received from Treasury, purchased and deposited.
Face value.	*Face value.*	*Face value.*	*Face value.*	*Face value.*	*Face value.*	*Face value.*	*Face value.*
.....	$2,440.00	$173,500.00	$180.00	$6,620.00	$101,860.00	$297,240.00	$399,100.00
.....	4,140.00	177,650.00	70.00	830.00	48,460.00	235,740.00	284,200.00
.....	8,145.00	239,005.00	20.00	2,370.00	68,730.00	334,180.00	402,910.00
.....	27.00	183.00	.....	6.00	.....	315.00	315.00
.....	1,302.50	12,272.50	5.00	147.50	895.00	21,442.50	22,337.50
.....	28.00	348.00	1.00	28.00	1.00	878.00	879.00
.....	16,082.50	602,958.50	276.00	10,001.50	219,946.00	889,795.50	1,109,741.50
.....	1.00	91.00	.....	.....	.....	426.00	426.00
.....	220.00	92.00	.....	.....	15,000.00	961.00	15,961.00
$872,327.00	182.00	246.50	.....	.....	1,570,451.00	966.00	1,571,417.00
714,305.00	135.00	212.50	.....	.....	1,739,261.00	756.50	1,740,017.50
166.60	6.40	.....	.....	.....	424.00	7.00	431.00
128,189.90	68.30	2,350.40	.....	.....	613,174.90	2,618.80	615,793.70
678.50	11.60	.50	.....	.....	4,126.65	30.95	4,157.60
33.00	.....	.....	.....	.....	324.23	2.58	326.81
1,715,700.00	624.30	2,992.90	.....	.....	3,942,761.78	5,768.83	3,948,530.61
Stand. ozs.	*Stand. ozs.*	*Stand. ozs.*	*Stand. ozs.*	*Stand. ozs.*	*Stand. ozs.*	*Stand. ozs.*	*Stand. ozs.*
.....	855.081	32,093.427	14.364	531.245	11,754.970	47,310.970	59,065.940
1,310,696.50	501.20	2,145.29	.....	.....	3,001,167.94	4,388.17	3,005,556.11
$15,908.48	$15,908.48	$597,087.02	$267.24	$9,883.63	$218,697.11	$880,204.11	$1,098,901.22
1,630,726.58	623.58	2,669.10	.....	.....	3,733,956.97	5,459.62	3,739,416.59
1,525,174.11	583.21	2,496.34	.....	.....	3,492,268.15	5,106.23	3,497,374.38
.....	174.02	5,871.48	8.76	117.87	1,248.89	9,591.39	10,840.28
84,973.42	.72	323.80	.....	.....	208,804.81	337.74	209,142.55
.....	.....	.....	.....	.....	.....	28.53	28.53
.....	.....	.....	.....	.....	.....	.....	209,114.02

X.—QUANTITY AND COST OF SILVER USED IN THE COINAGE OF SILVER DOLLARS, WASTED AND SOLD IN SWEEPS, DURING THE CALENDAR YEAR 1895, UNDER ACT OF JULY 14, 1890.

MINT AT PHILADELPHIA.

Month.	COINED.		TOTAL EMPLOYMENT.		Dollars coined.	Seigniorage.
	Ounces, standard.	Cost.	Ounces, standard.	Cost.		
1895.						
January						
February						
March	249.22	$203.02	249.22	$203.02	200	$96.98
April						
May	154.69	126.01	154.69	126.01	180	53.99
June	10,312.50	8,400.69	10,312.50	8,400.69	12,000	3,599.31
July						
August						
September	77.34	63.00	77.34	63.00	90	27.00
October						
November						
December	275.00	224.02	275.00	224.02	320	95.98
Total	11,068.75	9,016.74	11,068.75	9,016.74	12,880	3,863.26

MINT AT SAN FRANCISCO.

January						
February	85,937.50	$69,370.93	85,937.50	$69,370.93	100,000	$30,629.07
March	85,937.50	69,370.93	85,937.50	69,370.93	100,000	30,629.07
April	85,937.50	69,370.93	85,937.50	69,370.93	100,000	30,629.07
May	85,937.50	69,370.93	85,937.50	69,370.93	100,000	30,629.07
June						
July						
August						
September						
October						
November						
December						
Total	343,750.00	277,483.72	343,750.00	277,483.72	400,000	122,516.28

X.—QUANTITY AND COST OF SILVER USED IN THE COINAGE OF SILVER DOLLARS, WASTED AND SOLD IN SWEEPS, ETC.—Continued.

MINT AT NEW ORLEANS.

Month.	COINED.		TOTAL EMPLOYMENT.		Dollars coined.	Seigniorage.
	Ounces, standard.	Cost.	Ounces, standard.	Cost.		
1895.						
January	171,875.00	$132,825.85	171,875.00	$132,825.85	200,000	$67,174.15
February	85,937.50	66,412.92	85,937.50	66,412.92	100,000	33,587.08
March						
April	85,937.50	66,412.92	85,937.50	66,412.92	100,000	33,587.08
May	42,968.75	33,206.46	42,968.75	33,206.46	50,000	16,793.54
June						
July						
August						
September						
October						
November						
December						
Total	386,718.75	298,858.15	386,718.75	298,858.15	450,000	151,141.85

RECAPITULATION.

January	171,875.00	$132,825.85	171,875.00	$132,825.85	200,000	$67,174.15
February	171,875.00	135,783.85	171,875.00	135,783.85	200,000	64,216.15
March	86,186.72	69,573.95	86,186.72	69,573.95	100,290	30,716.05
April	171,875.00	135,783.85	171,875.00	135,783.85	200,000	64,216.15
May	129,060.94	102,703.40	129,060.94	102,703.40	150,180	47,476.60
June	10,312.50	8,400.69	10,312.50	8,400.69	12,000	3,599.31
July						
August						
September	77.34	63.00	77.34	63.00	90	27.00
October						
November						
December	275.00	224.02	275.00	224.02	320	95.98
Total	741,537.50	585,358.61	741,537.50	585,358.61	862,880	277,521.39

XII.—Nominal Value of Materials Used in the Subsidiary Silver Coinage during the Calendar Year 1895.

Sources from which bullion was obtained.	Fine ounces.	Cost.	Coinage.
MINT AT PHILADELPHIA.			
Worn and uncurrent coin	1,382,505.18	$1,911,187.39	$1,915,169.00
Partings, charges, and fractions purchased	174,935.57	116,913.24	
Melted assay coins purchased	417.37	561.16	181,748.00
Mutilated coins purchased	1,058.97	671.14	
Surplus bullion purchased	1,833.11	1,234.43	
Total	1,560,750.20	2,030,567.36	2,096,917.00
MINT AT SAN FRANCISCO.			
Worn and uncurrent coin	138,919.11	192,043.00	992,213.25
Partings, charges, and fractions purchased	47,395.96	30,315.48	
Mutilated coins purchased	91.17	57.37	115,000.00
Surplus bullion purchased	2,615.13	1,606.75	
Total	189,021.37	224,022.60	1,107,213.25
MINT AT NEW ORLEANS.			
Worn and uncurrent coin	1,391,970.35	1,924,272.12	1,631,000.00
Partings, charges, and fractions purchased	3,046.52	1,950.27	
Mutilated coins purchased	451.08	283.64	.....
Total	1,395,467.95	1,926,506.03	1,631,000.00
MINT AT CARSON.			
Partings, charges, and fractions purchased	1,437.52	916.35	.....
Surplus bullion purchased	3,069.07	1,885.13	
Total	4,506.59	2,801.48	.....
SUMMARY.			
Worn and uncurrent coin	2,913,394.64	4,027,502.51	4,538,382.25
Partings, charges, and fractions purchased	226,815.57	150,095.34	
Melted assay coins purchased	417.37	561.16	296,748.00
Mutilated coins purchased	1,601.22	1,012.15	
Surplus bullion purchased	7,517.31	4,726.31	
Total	3,149,746.11	4,183,897.47	4,835,130.25

XII.—STATEMENT SHOWING THE AMOUNT AND COST OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, AND USED IN THE COINAGE OF STANDARD SILVER DOLLARS, WASTED, AND SOLD IN SWEEPS; NUMBER OF DOLLARS COINED AND SEIGNIORAGE ON THE SAME, FROM AUGUST 13, 1890, TO JANUARY 1, 1896.

Disposition.	Fine ounces.	Cost.
Total amount purchased, and cost	168, 674, 682. 53	$155, 931, 002. 25
Used in coinage to January 1, 1896	30, 971, 812. 81	31, 791, 759. 36
Wasted and sold in sweeps	63, 570. 37	62, 535. 64
Total amount used	31, 035, 383. 18	31, 854, 295. 00
Balance on hand January 1, 1896	137, 639, 299. 35	124, 076, 707. 25
Total	168, 674, 682. 53	155, 931, 002. 25

Silver dollars coined	$40, 044, 364. 00
Seigniorage on same	8, 252, 604. 64

STATEMENT SHOWING THE AMOUNT AND COST OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, AND USED IN THE COINAGE OF STANDARD SILVER DOLLARS, WASTED, AND SOLD IN SWEEPS; NUMBER OF DOLLARS COINED AND SEIGNIORAGE ON THE SAME, FROM AUGUST 13, 1890, TO JULY 1, 1896.

Disposition.	Fine ounces.	Cost.
Total amount purchased, and cost	168, 674, 682. 53	$155, 931, 002. 25
Used in coinage to July 1, 1896	36, 772, 912. 70	36, 964, 557. 38
Wasted and sold in sweeps	63, 570. 37	62, 535. 64
Total amount used	36, 836, 483. 07	37, 027, 093. 02
Balance on hand July 1, 1896	131, 838, 199. 46	118, 903, 909. 23
Total	168, 674, 682. 53	155, 931, 002. 25

Silver dollars coined	$47, 544, 776. 00
Seigniorage on same	10, 580, 218. 62

XIII.—SILVER FOR SUBSIDIARY

Stock.	PHILADELPHIA.		SAN FRANCISCO.	
	Ounces, fine.	Cost.	Ounces, fine.	Cost.
Silver bullion on hand Jan. 1, 1895	65, 245. 60	$45, 700. 25	621, 056. 15	$826, 267. 61
Uncurrent coins transferred from Treasury	1, 382, 505. 18	1, 911, 187. 39	138, 919. 11	192, 043. 60
Partings, charges, and fractions purchased	174, 935. 57	116, 912. 24	47, 395. 96	30, 315. 48
Melted assay coins purchased	417. 37	561. 16		
Mutilated coins purchased	1, 058. 97	671. 14	91. 17	57. 37
Surplus bullion purchased	1, 833. 11	1, 234. 43	2, 615. 13	1, 606. 75
Total	1, 625, 995. 80	2, 076, 267. 61	810, 077. 52	1, 050, 290. 21
Used in coinage, calendar year 1895	1, 516, 857. 32	2, 003, 459. 70	800, 930. 40	1, 044, 538. 94
Transferred	. 09	. 06		
Sold in sweeps	3, 409. 31	2, 285. 07	2, 191. 90	1, 346. 72
Wasted by operative officers	713. 91	482. 74	867. 26	532. 85
Balance on hand Jan. 1, 1896	105, 015. 17	70, 040. 04	6, 087. 96	3, 871. 70
Total	1, 625, 995. 80	2, 076, 267. 61	810, 077. 52	1, 050, 290. 21

XIV.—COINAGE EXECUTED AT THE MINTS OF THE UNITED

Denomination.	PHILADELPHIA.	
	Pieces.	Value.
GOLD.		
Double eagles	1, 114, 656	$22, 293, 120. 00
Eagles	567, 826	5, 678, 260. 00
Half eagles	1, 345, 936	6, 729, 680. 00
Quarter eagles	6, 119	15, 297. 50
Total gold coinage	3, 034, 537	34, 716, 357. 50
SILVER.		
Dollars, act July 14, 1890	12, 880	12, 880. 00
Subsidiary:		
Half dollars	1, 835, 218	917, 609. 00
Quarter dollars	4. 440, 880	1, 110, 220. 00
Dimes	690, 880	69, 088. 00
Total subsidiary	6, 966, 978	2, 096, 917. 00
Total silver coinage	6, 979, 858	2, 109, 797. 00
MINOR.		
Five cents	9, 979, 884	498, 994. 20
One cent	38, 343, 636	383, 436. 36
Total minor coinage	48, 323, 520	882, 430. 56
Total coinage	58, 337, 915	37, 708, 585. 06

In addition to the above, the mint at Philadelphia executed for the Government of Ecuador 5,000,000 twenty-cent silver pieces of the value of $1,000,000.

Coinage operations at the mint at New Orleans suspended under order of October 21, to take effect from November 1, 1895; coinage resumed February 1, 1896.

Coinage of silver dollars under act of—

February 28, 1878	$378, 166, 793
July 14, 1890	40, 044, 364
March 31, 1891	5, 078, 472
Total	423, 289, 629

COINAGE, CALENDAR YEAR 1895.

NEW ORLEANS.		CARSON.		SUMMARY.	
Ounces, fine.	Cost.	Ounces, fine.	Cost.	Ounces, fine.	Cost.
2,395.91	$1,693.88	354.09	$220.32	689,051.75	$873,882.06
1,391,970.35	1,924,272.12	.....	.....	2,913,394.64	4,027,502.51
3,046.52	1,950.27	1,437.62	916.35	226,815.67	150,095.34
.....	.....	.....	.....	417.37	561.16
451.08	283.64	.....	.....	1,601.22	1,012.15
.....	.....	3,069.07	1,885.13	7,517.31	4,726.31
1,397,863.86	1,928,199.91	4,860.78	3,021.80	3,838,797.96	5,057,779.53
1,179,824.63	1,631,000.00	.....	.....	3,497,612.35	4,678,908.64
207,207.54	286,445.54	400.71	321.90	207,608.34	286,767.50
2,623.38	1,648.48	817.76	502.35	9,042.35	5,782.02
2,199.91	1,319.55	.....	.....	3,781.08	2,335.14
6,008.40	7,786.34	3,642.31	2,197.55	120,753.84	83,895.63
1,397,863.86	1,928,199.91	4,860.78	3,021.80	3,838,797.96	5,057,779.53

STATES DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

SAN FRANCISCO.		NEW ORLEANS.		TOTAL.	
Pieces.	Value.	Pieces.	Value.	Pieces.	Value.
1,143,500	$22,870,000.00	.....	.....	2,258,156	$45,163,120.00
49,000	490,000.00	98,000	$980,000.00	714,826	7,148,260.00
112,000	560,000.00	.....	.....	1,457,936	7,289,680.00
.....	.....	.....	.....	6,119	15,297.50
1,304,500	23,920,000.00	98,000	980,000.00	4,437,037	59,616,357.50
400,000	400,000.00	450,000	450,000.00	862,880	862,880.00
1,108,086	554,043.00	1,766,000	883,000.00	4,709,304	2,354,652.00
1,764,681	441,170.25	2,816,000	704,000.00	9,021,561	2,255,390.25
1,120,000	112,000.00	440,000	44,000.00	2,250,880	225,088.00
3,992,767	1,107,213.25	5,022,000	1,631,000.00	15,981,745	4,835,130.25
4,392,767	1,507,213.25	5,472,000	2,081,000.00	16,844,625	5,698,010.25
.....	.....	.....	.....	9,979,884	498,994.20
.....	.....	.....	.....	38,343,636	383,436.36
.....	.....	.....	.....	48,323,520	882,430.56
5,697,267	25,427,213.25	5,570,000	3,061,000.00	69,605,182	66,196,798.31

XV.—ASSETS AND LIABILITIES OF THE UNITED

ASSETS.

Institutions.	GOLD BULLION.		SILVER BULLION.		Value of bullion shipped for coinage.
	Standard ounces.	Value.	Standard ounces.	Value (cost).	
COINAGE MINTS.					
Philadelphia	982, 291. 469	$18, 275, 190. 11	132, 224, 565. 49	$107, 686, 623. 94	.....
San Francisco	66, 840. 915	1, 243, 551. 82	12, 077, 887. 18	9, 732, 477. 76	.....
New Orleans	9, 491. 707	176, 590. 25	8, 122, 475. 18	6, 279, 716. 34	.....
Carson	12, 627. 478	234, 929. 82	642, 280. 24	462, 054. 94	.....
ASSAY OFFICES.					
New York	498, 911. 968	9, 282, 082. 92	552, 399. 99	533, 181. 33	.....
Denver	6, 928. 474	128, 901. 85	1, 181. 21	708. 73	$63, 803. 63
Helena	2, 646. 945	49, 245. 48	858. 55	515. 13	36, 561. 86
Boise	1, 010. 131	18, 793. 14	377. 90	226. 74	17, 681. 51
Charlotte	1, 104. 088	20, 541. 17	89. 08	53. 41	.....
St. Louis	759. 414	14, 128. 64	231. 48	138. 71	.....
Total	1, 582, 612. 589	29, 443, 955. 20	153, 622, 346. 30	124, 695, 697. 03	118, 047. 00

LIABILITIES.

Institutions.	Bullion fund.	Undeposited earnings.
COINAGE MINTS.		
Philadelphia	$183, 555, 394. 15	.....
San Francisco	50, 722, 321. 63	.....
New Orleans	17, 599, 839. 75	.....
Carson	5, 947, 489. 56	.....
ASSAY OFFICES.		
New York	13, 567, 665. 33	$14, 574. 99
Denver	432, 989. 63	2, 174. 93
Helena	248, 330. 66	1, 596. 93
Boise	79, 042. 86	380. 42
Charlotte	36, 133. 05	241. 72
St. Louis	21, 176. 69	176. 03
Total	272, 210, 383. 31	19, 145. 02

STATES MINTS AND ASSAY OFFICES, DECEMBER 31, 1895.

ASSETS.

Gold coin.	Silver coin.	Credit balances with assistant treasurers and depository banks.	Minor coin.	Minor coinage metal.	Deficiencies.	Total.
$2,765,440.00	$55,004,909.72	.....	$88,013.50	$44,349.40	$13,543.82	$183,878,070.49
2,515,355 00	36,870,594.84	.....	.....	.....	413,557.96	50,775,537.38
1,467,495.00	9,651,111.95	.....	.....	.....	25,000.00	17,599,913.54
712.59	5,156,903.73	$17,338.73	.....	.....	75,549.75	5,947,489.56
16,865.00	1,812.41	a3,837,470.61	.....	.....	.....	13,671,412.27
.....	.....	241,750.35	.....	.....	.....	435,164.56
.....	.....	163,605.12	.....	.....	.....	249,927.59
.....	.....	42,721.89	.....	.....	.....	79,423.28
.....	.....	15,780.19	.....	.....	.....	36,374.77
.....	.....	7,085.37	.....	.....	.....	21,352.72
6,765,867.59	106,685,332.65	4,325,752.26	88,013.50	44,349.40	527,651.53	272,694,666.16

a Gold coin, $3,749,926.43; silver coin, $87,544.18.

LIABILITIES.

Seigniorage on silver.	Unpaid depositors.	Minor coinage profits.	Minor coin metal found.	Unpaid cent depositors and subtreasury transfers.	Total.
$71,656.05	$118,657.39	$41,044.70	$17,000.00	$74,318.20	$183,878,070.49
10,799.26	42,416.49	.....	.....	.....	50,775,537.38
.....	73.79	.....	.....	.....	17,599,913.54
.....	.....	.....	.....	.....	5,947,489.56
.....	89,171.95	.....	.....	.....	13,671,412.27
.....	.....	.....	.....	.....	435,164.56
.....	.....	.....	.....	.....	249,927.59
.....	.....	.....	.....	.....	79,423.28
.....	.....	.....	.....	.....	36,374.77
.....	.....	.....	.....	.....	21,352.72
82,455.31	250,319.62	41,044.70	17,000.00	74,318.20	272,694,666.16

XVI.—UNREFINED GOLD AND SILVER OF DOMESTIC PRODUCTION, WITH THE STATES AND TERRITORIES PRODUCING THE SAME, AND REFINED DOMESTIC BULLION NOT DISTRIBUTED, BY VALUE, DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES FROM THEIR ORGANIZATION TO THE CLOSE OF THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

Source.	Gold.	Silver.	Total.
Alabama	$249,262.06	$295.97	$249,558.03
Alaska	1,833,739.15	19,783.89	1,853,523.04
Arizona	7,732,297.25	14,099,082.64	21,831,379.89
California	770,794,714.28	4,276,940.61	775,071,654.89
Colorado	70,910,438.43	24,895,976.62	95,806,415.05
Connecticut	125.82		125.82
Georgia	9,338,078.91	7,333.67	9,345,412.58
Idaho	36,260,244.23	1,981,544.12	38,241,788.35
Iowa	115.59	1.38	116.97
Maine	6,311.06	22.90	6,333.96
Maryland	17,578.38	40.91	17,619.29
Michigan	454,580.58	4,104,386.17	4,558,966.75
Minnesota	5,113.59	65.66	5,179.25
Missouri	96.71	359.11	455.82
Montana	75,699,148.95	22,128,295.84	97,827,444.79
Nebraska	2,340.26	273,226.13	275,566.39
Nevada	34,727,919.89	104,397,960.61	139,125,880.50
New Hampshire	481.34	1.75	483.09
New Mexico	6,336,259.56	7,110,094.42	13,446,353.98
North Carolina	11,827,382.81	66,930.57	11,894,313.38
Oregon	22,547,378.03	100,841.73	22,648,219.76
South Carolina	2,447,831.19	4,479.05	2,452,310.24
South Dakota	54,118,376.23	1,097,131.84	55,215,508.07
Tennessee	91,088.16	15.20	91,103.36
Texas	8,141.20	3,447.01	11,588.21
Utah	1,659,555.97	19,928,986.49	21,588,542.46
Vermont	78,647.87	84.65	78,732.52
Virginia	1,763,795.40	452.16	1,764,247.56
Washington	1,117,586.65	16,223.78	1,133,810.43
Wisconsin	325.73	7.02	332.75
Wyoming	875,573.20	13,291.49	888,864.69
Other sources	42,042,421.66	42,948,142.50	84,990,564.16
Total unrefined bullion	1,152,946,950.14	247,475,445.89	1,400,422,396.03
Refined bullion	484,129,686.29	534,464,851.58	1,018,594,537.87
Total bullion	1,637,076,636.43	781,940,297.47	2,419,016,933.90

XVII.—Product of Gold and Silver in the United States from 1792 to 1844, and Annually Since.

[The estimate for 1792–1873 is by R. W. Raymond, commissioner, and since by Director of the Mint.]

Year.	Gold.	Silver.	Total.
April 2, 1792–July 31, 1834	$14,000,000	Insignificant.	$14,000,000
July 31, 1834–December 31, 1844	7,500,000	$250,000	7,750,000
1845	1,008,327	50,000	1,058,327
1846	1,139,357	50,000	1,189,357
1847	889,085	50,000	939,085
1848	10,000,000	50,000	10,050,000
1849	40,000,000	50,000	40,050,000
1850	50,000,000	50,000	50,050,000
1851	55,000,000	50,000	55,050,000
1852	60,000,000	50,000	60,050,000
1853	65,000,000	50,000	65,050,000
1854	60,000,000	50,000	60,050,000
1855	55,000,000	50,000	55,050,000
1856	55,000,000	50,000	55,050,000
1857	55,000,000	50,000	55,050,000
1858	50,000,000	500,000	50,500,000
1859	50,000,000	100,000	50,100,000
1860	46,000,000	150,000	46,150,000
1861	43,000,000	2,000,000	45,000,000
1862	39,200,000	4,500,000	43,700,000
1863	40,000,000	8,500,000	48,500,000
1864	46,100,000	11,000,000	57,100,000
1865	53,225,000	11,250,000	64,475,000
1866	53,500,000	10,000,000	63,500,000
1867	51,725,000	13,500,000	65,225,000
1868	48,000,000	12,000,000	60,000,000
1869	49,500,000	12,000,000	61,500,000
1870	50,000,000	16,000,000	66,000,000
1871	43,500,000	23,000,000	66,500,000
1872	36,000,000	28,750,000	64,750,000
1873	36,000,000	35,750,000	71,750,000
1874	33,500,000	37,300,000	70,800,000
1875	33,400,000	31,700,000	65,100,000
1876	39,900,000	38,800,000	78,700,000
1877	46,900,000	39,800,000	86,700,000
1878	51,200,000	45,200,000	96,400,000
1879	38,900,000	40,800,000	79,700,000
1880	36,000,000	39,200,000	75,200,000
1881	34,700,000	43,000,000	77,700,000
1882	32,500,000	46,800,000	79,300,000
1883	30,000,000	46,200,000	76,200,000
1884	30,800,000	48,800,000	79,600,000
1885	31,800,000	51,600,000	83,400,000
1886	35,000,000	51,000,000	86,000,000
1887	33,000,000	53,350,000	86,350,000
1888	33,175,000	59,195,000	92,370,000
1889	32,800,000	64,646,000	97,446,000
1890	32,845,000	70,465,000	103,310,000
1891	33,175,000	75,417,000	108,592,000
1892	33,000,000	82,101,000	115,101,000
1893	35,955,000	77,576,000	113,531,000
1894	39,500,000	64,000,000	103,500,000
1895	46,610,000	72,051,000	118,661,000
Total	2,059,946,769	1,368,901,000	3,428,847,769

XVIII.—WELLS, FARGO & COMPANY (EXPRESS AND BANKING)—PRECIOUS METALS PRODUCT, UNITED STATES AND MEXICO.

SAN FRANCISCO, *December 31, 1895.*

DEAR SIR: The following is our annual report of precious metals produced in the States and Territories west of the Missouri River (including British Columbia) during 1895, which shows in the aggregate: Gold, $48,667,383; silver, $35,274,777; copper, $27,052,115; lead, $7,170,367; total gross result, $118,164,642. The "commercial" value at which the several metals named herein have been estimated is: Silver, 65 cents per ounce; copper, 11 cents per pound; and lead, $3.23 per hundredweight.

Allowance must always be made for probable variations from reported figures, by reason of constantly increasing facilities for transporting bullion, ores, and base metals from the mines outside of the express and the difficulty of getting entirely reliable data from private sources. Estimates obtained in this way are liable to be exaggerated and are, to a considerable degree, guesswork; but with some modifications on this account, made herein, the general results reached, while only approximately correct, may be accepted as the closest approximation possible under the circumstances.

States and Territories.	Gold dust and bullion by express.	Gold dust and bullion by other conveyances.	Silver bullion by express.	Ores and base bullion by freight.	Total.
California	$10,940,491	$3,063,617	$157,229	$286,575	$14,447,912
Nevada	1,239,735	319,581	662,647	359,950	2,581,913
Oregon	1,599,785	150,000	102,645	.....	1,852,430
Washington	314,817	35,000	202,650	.....	552,467
Alaska	.....	1,454,420	.....	15,000	1,469,420
Idaho	2,521,000	.....	2,723,646	2,182,252	7,426,898
Montana	4,500,000	.....	9,425,000	23,907,500	37,832,500
Utah	647,405	704,785	1,116,767	6,753,095	9,222,052
Colorado	13,380,271	.....	12,888,401	2,270,987	28,545,659
New Mexico	256,665	1,321,300	293,881	627,740	2,499,586
Arizona	1,206,503	1,230,069	160,019	4,756,185	7,352,776
Dakota	3,475,785	.....	175,000	38,000	3,688,785
Texas	.....	.....	380,300	7,040	387,340
Wyoming	32,500	.....	4,750	.....	37,250
British Columbia	267,654	.....	.....	.....	267,654
Total	40,388,611	8,278,772	28,292,935	41,204,324	118,164,642

The gross yield for 1895, shown above, segregated, is approximately as follows:

Metal.	Per cent of total.	Total value.
Gold	$41\frac{11}{100}$	$48,667,383
Silver	$29\frac{84}{100}$	35,274,777
Copper	$22\frac{88}{100}$	27,052,115
Lead	$6\frac{1}{100}$	7,170,367
Total	.....	118,164,642

ANNUAL PRODUCTS OF LEAD, COPPER, SILVER, AND GOLD IN THE STATES AND TERRITORIES WEST OF THE MISSOURI RIVER, 1870–1895.

Year.	Production as per W., F. & Co's. statements, including amounts from British Columbia and west coast of Mexico.	Product after deducting amounts from British Columbia and west coast of Mexico.	The net products of the States and Territories west of the Missouri River, exclusive of British Columbia and west coast of Mexico, divided, are as follows:			
			Lead.	Copper.	Silver.	Gold.
1870	$54,000,000	$52,150,000	$1,080,000	.....	$17,320,000	$33,750,000
1871	58,284,000	55,784,000	2,100,000	.....	19,286,000	34,398,000
1872	62,236,959	60,351,824	2,250,000	.....	19,924,429	38,177,395
1873	72,258,603	70,139,860	3,450,000	.....	27,483,302	39,206,558
1874	74,401,045	71,965,610	3,800,000	.....	29,699,122	38,466,488
1875	80,889,057	76,703,433	5,100,000	.....	31,035,239	39,968,194
1876	90,875,173	87,219,859	5,040,000	.....	39,292,924	42,886,935
1877	98,421,754	95,811,582	5,085,250	.....	45,846,109	44,880,223
1878	81,154,622	78,276,167	3,452,000	.....	37,248,137	37,576,030
1879	75,349,501	72,688,888	4,185,769	.....	37,032,857	31,470,262
1880	80,167,936	77,232,512	5,742,390	$898,000	38,033,055	32,559,067
1881	84,504,417	81,198,474	6,361,902	1,195,000	42,987,613	30,653,959
1882	92,411,835	89,207,549	8,008,155	4,055,037	48,133,039	29,011,318
1883	90,313,612	84,639,212	8,163,550	5,683,021	42,975,101	27,816,640
1884	84,975,954	81,633,835	6,834,091	6,086,252	43,529,925	25,183,567
1885	90,181,260	87,311,382	8,562,991	7,838,036	44,516,599	26,393,756
1886	103,011,761	100,160,222	9,185,192	9,276,755	52,136,851	29,561,424
1887	104,645,959	103,327,770	9,631,073	10,362,746	50,833,884	32,500,067
1888	114,341,592	112,665,569	11,263,630	18,261,490	53,152,747	29,987,702
1889	127,677,836	126,723,384	14,593,323	14,793,763	64,808,637	32,527,661
1890	127,166,410	126,804,855	11,509,571	20,569,092	62,930,831	31,795,361
1891	118,237,441	117,946,565	12,385,750	13,261,663	60,614,004	31,685,118
1892	111,531,700	111,259,508	11,433,947	19,370,516	50,607,601	29,847,444
1893	104,081,591	103,827,623	7,756,040	23,631,339	38,491,521	33,948,723
1894	105,113,489	104,844,112	8,223,513	22,276,294	28,721,014	45,623,291
1895	118,164,642	117,896,988	7,170,367	27,052,115	35,274,777	48,399,729

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, $31,023,480; from San Francisco, $12,933,307; total, $43,956,787, as against $60,022,858 last year. Pound sterling estimated at $4.84.

STATEMENT OF THE PRODUCT OF GOLD AND SILVER IN THE REPUBLIC OF MEXICO, REVISED AND CORRECTED FROM 1877 TO 1895.—VALUES UPON MINTAGE BASIS.

Year.	Gold.	Silver.	Total.
1877-78	$747,000	$24,837,000	$25,584,000
1878-79	881,000	25,125,000	26,006,000
1879-80	942,000	26,800,000	27,742,000
1880-81	1,013,000	29,234,000	30,247,000
1881-82	937,000	29,329,000	30,266,000
1882-83	956,000	29,569,000	30,525,000
1883-84	1,055,000	31,695,000	32,750,000
1884-85	914,000	33,226,000	34,140,000
1885-86	1,026,000	34,112,000	35,138,000
1886-87	1,047,000	34,600,000	35,647,000
1887-88	1,031,000	34,912,000	35,943,000
1888-89	1,040,000	40,706,000	41,746,000
1889-90	1,100,000	41,500,000	42,600,000
1890-91	1,150,000	43,000,000	44,150,000
1891-92	1,275,000	45,750,000	47,025,000
1892-93	1,400,000	48,500,000	49,900,000
1893-94	1,425,000	47,250,000	48,675,000
1894-95	4,750,000	54,225,000	58,975,000
Total	22,689,000	654,370,000	677,059,000

EXHIBIT OF COINAGE OF GOLD, SILVER, AND COPPER IN THE REPUBLIC OF MEXICO FROM JULY 1, 1873, TO JUNE 30, 1895.

Year.	Gold.	Silver.	Copper.
1873-74	$866,743	$18,846,067	$15,966
1874-75	862,619	19,386,958	21,712
1875-76	809,401	19,454,054	30,654
1876-77	695,750	21,415,128	9,035
1877-78	691,998	22,084,203	41,364
1878-79	658,206	22,162,987	16,300
1879-80	521,826	24,018,528	14,035
1880-81	492,068	24,617,395	42,258
1881-82	452,590	25,146,260	11,972
1882-83	407,600	24,083,921	.....
1883-84	328,698	25,377,379	.....
1884-85	423,250	25,840,728	.....
1885-86	425,000	25,850,000	.....
1886-87	410,000	25,600,000	.....
1887-88	340,320	26,711,000	.....
1888-89	305,100	25,274,500	.....
1889-90	243,298	24,328,326	.....
1890-91	308,000	24,238,000	.....
1891-92	291,940	25,527,000	.....
1892-93	361,672	27,169,876	.....
1893-94	553,978	30,185,611	.....
1894-95	545,237	27,628,981	.....
Total	10,995,294	534,946,902	203,296

SUMMARY.—Totals: Gold, $10,995,294; silver, $534,946,902; copper, $203,296. Grand total, $546,145,492.

EXHIBIT OF THE COINAGE OF MEXICO FROM THE ESTABLISHMENT OF THE MINTS IN 1537 TO THE END OF THE FISCAL YEAR 1895.

	Gold.	Silver.	Copper	Total.
COLONIAL EPOCH.				
Unmilled coin, from 1537 to 1731	$8,497,950	$752,067,456	$200,000	$760,765,406
Pillar coin, 1732 to 1771	19,889,014	441,629,211	.....	461,518,225
Bust coin, 1772 to 1821	40,391,447	888,503,989	342,893	929,298,329
Total	68,778,411	2,082,260,656	542,893	2,151,581,960
INDEPENDENCE.				
Iturbide's imperial bust, from 1822 to 1823	557,392	18,575,569	.....	19,132,961
Republic eagle, 1824 to June 30, 1873	45,040,628	740,246,485	5,235,177	790,522,290
Total	45,598,020	758,822,054	5,235,177	809,655,251
REPUBLIC.				
Eagle coin, from July 1, 1873, to June 30, 1895	10,955,294	534,946,902	203,296	546,145,492

SUMMARY.—Colonial epoch, from 1537 to 1821, $2,151,581,960; Independence, from 1822 to 1873, $809,655,251; Republic, from 1873 to 1895, $546,145,492. Total, $3,507,382,703.

It will be observed that in current product—both gold and silver—Mexico shows a continued increase.

JNO. J. VALENTINE, *President.*

XIX.—HIGHEST, LOWEST, AND AVERAGE PRICE OF BAR SILVER IN LONDON PER OUNCE, BRITISH STANDARD (0.925), SINCE 1833, AND THE EQUIVALENT IN UNITED STATES GOLD COIN OF AN OUNCE 1,000 FINE TAKEN AT THE AVERAGE PRICE.

Calendar year.	Lowest quotation.	Highest quotation.	Average quotation.	Value of an ounce, fine, at average quotation.	Calendar year.	Lowest quotation.	Highest quotation.	Average quotation.	Value of an ounce, fine, at average quotation.
	d.	*d.*	*d*	*Dollars.*		*d.*	*d.*	*d*	*Dollars.*
1833	58 3/4	59 3/8	59 3/16	1.297	1865	60 1/2	61 1/8	61 1/16	1.338
1834	59 3/8	60 1/8	59 11/16	1.313	1866	60 3/8	62 1/4	61 1/8	1.339
1835	59 1/2	60	59 11/16	1.308	1867	60 3/8	61 1/2	60 15/16	1.328
1836	59 5/8	60 3/8	60	1.315	1868	60 1/2	61 1/8	60 1/2	1.326
1837	59	60 3/8	59 15/16	1.305	1869	60	61	60 7/16	1.325
1838	59 1/2	60 1/2	59 5/8	1.304	1870	60 1/4	60 3/4	60 5/16	1.328
1839	60	60 5/8	60 3/8	1.323	1871	60 3/16	61	60 1/2	1.326
1840	60 1/2	60 3/4	60 3/8	1.323	1872	59 1/2	61 1/8	60 5/16	1.322
1841	59 3/4	60 3/8	60 1/16	1.316	1873	57 3/8	59 11/16	59 1/4	1.298
1842	59 1/2	60	59 7/16	1.303	1874	57 1/2	59 1/8	58 15/16	1.278
1843	59	59 5/8	59 3/16	1.297	1875	55 1/2	57 1/8	56 3/8	1.246
1844	59 1/2	59 3/4	59 5/8	1.304	1876	46 3/4	58 1/8	52 3/8	1.156
1845	58 7/8	59 1/8	59 1/2	1.298	1877	53 1/4	58 1/4	54 1/16	1.201
1846	59	60 1/8	59 3/16	1.30	1878	49 1/8	55 1/2	52 5/16	1 152
1847	58 7/8	60 3/8	59 11/16	1.308	1879	48 7/8	53 3/8	51 1/4	1.123
1848	58 1/8	60	59 1/8	1.304	1880	51 3/8	52 7/8	52 1/4	1.145
1849	59 1/8	60	59 3/8	1.309	1881	50 1/8	52 7/8	51 1/16	1.138
1850	59 1/8	61 1/8	61 1/16	1.316	1882	50	52 3/8	51 1/16	1.136
1851	60	61 3/8	61	1.337	1883	50	51 3/16	50 3/8	1.11
1852	59 7/8	61 1/8	60 1/8	1.326	1884	49 1/8	51 3/8	50 1/4	1.113
1853	60 3/8	61 1/8	61 1/8	1.348	1885	46 1/8	50	48 3/16	1.0645
1854	60 1/8	61 1/8	61 1/8	1.348	1886	42	47	45 3/8	0 9946
1855	60	61 3/8	61 3/16	1.344	1887	43 1/4	47 1/8	44 3/8	0.97823
1856	60 1/8	62 1/4	61 3/16	1.344	1888	41 3/8	44 5/16	42 3/8	0 93897
1857	61	62 3/8	61 3/8	1.353	1889	42	44 3/8	41 11/16	0 93512
1858	60 3/8	61 1/8	61 3/16	1.344	1890	43 3/8	54 3/8	47 1/2	1.04633
1859	61 1/4	62 1/4	62 1/16	1.36	1891	43 1/8	48 3/4	45 1/16	0.98782
1860	61 1/4	62 3/8	61 11/16	1.352	1892	37 1/8	43 3/4	39 3/4	0.87106
1861	60 1/8	61 3/8	60 13/16	1.333	1893	30 1/8	38 3/4	35 5/16	0.78031
1862	61	62 1/8	61 7/16	1.346	1894	27	31 1/2	28 5/8	0.64043
1863	61	61 1/2	61 3/8	1.345	1895	27 3/16	31 3/8	29 1/16	0 65406
1864	60 3/8	62 1/8	61 3/8	1.345					

XX.—Commercial Ratio of Silver to Gold each Year since 1687.

[Note.—From 1687 to 1832 the ratios are taken from Dr. A. Soetbeer; from 1833 to 1878 from Pixley and Abell's tables, and from 1879 to 1895 from daily cablegrams from London.]

Year.	Ratio.	Year.	Ratio.	Year.	Ratio.	Year.	Ratio.	Year.	Ratio.	Year.	Ratio.
1687....	14.94	1722...	15.17	1757...	14.87	1792...	15.17	1827...	15.74	1862...	15.35
1688....	14.94	1723...	15.20	1758...	14.85	1793...	15.00	1828...	15.78	1863...	15.37
1689....	15.02	1724...	15.11	1759...	14.15	1794...	15.37	1829...	15.78	1864...	15.37
1690....	15.02	1725...	15.11	1760...	14.14	1795...	15.55	1830...	15.82	1865...	15.44
1691....	14.98	1726...	15.15	1761...	14.54	1796...	15.65	1831...	15.72	1866...	15.43
1692....	14.92	1727...	15.24	1762...	15.27	1797...	15.41	1832...	15.73	1867...	15.57
1693....	14.83	1728...	15.11	1763...	14.99	1798...	15.59	1833...	15.93	1868...	15.59
1694....	14.87	1729...	14.92	1764...	14.70	1799...	15.74	1834...	15.73	1869...	15.60
1695....	15.02	1730...	14.81	1765...	14.83	1800...	15.68	1835...	15.80	1870...	15.57
1696....	15.00	1731...	14.94	1766...	14.80	1801...	15.46	1836..	15.72	1871...	15.57
1697....	15.20	1732...	15.09	1767...	14.85	1802...	15.26	1837...	15.83	1872 ..	15.63
1698....	15.07	1733...	15.18	1768...	14.80	1803...	15.41	1838 ..	15.85	1873...	15.92
1699....	14.94	1734...	15.39	1769...	14.72	1804...	15.41	1839...	15.62	1874...	16.17
1700....	14.81	1735...	15.41	1770...	14.62	1805...	15.79	1840...	15.62	1875 .	16.59
1701....	15.07	1736...	15.18	1771...	14.66	1806...	15.52	1841...	15.70	1876 ..	17.88
1702....	15.52	1737...	15.02	1772...	14.52	1807...	15.43	1842...	15.87	1877. .	17.22
1703....	15.17	1738...	14.91	1773...	14.62	1808...	16.08	1843...	15.93	1878 ..	17.94
1704....	15.22	1739...	14.91	1774...	14.62	1809...	15.96	1844...	15.85	1879...	18.40
1705....	15.11	1740...	14.94	1775...	14.72	1810...	15.77	1845...	15.92	1880 ..	18.05
1706....	15.27	1741...	14.92	1776...	14.55	1811...	15.53	1846...	15.90	1881...	18.16
1707....	15.44	1742..	14.85	1777...	14.54	1812...	16.11	1847 .	15.80	1882 .	18.19
1708....	15.41	1743...	14.85	1778...	14.68	1813...	16.25	1848...	15.85	1883...	18.64
1709....	15.31	1744...	14.87	1779...	14.80	1814...	15.04	1849...	15.78	1884..	18.57
1710....	15.22	1745...	14.98	1780...	14.72	1815...	15.26	1850...	15.70	1885...	19.41
1711....	15.29	1746...	15.13	1781...	14.78	1816...	15.28	1851...	15.40	1886..	20.78
1712....	15.31	1747...	15.26	1782...	14.42	1817...	15.11	1852...	15.59	1887...	21.13
1713....	15.24	1748...	15.11	1783...	14.48	1818..	15.35	1853...	15.33	1888..	21.99
1714....	15.13	1749...	14.80	1784...	14.70	1819...	15.33	1854...	15.33	1889...	22.10
1715....	15.11	1750...	14.55	1785...	14.92	1820...	15.62	1855...	15.38	1890...	19.76
1716....	15.09	1751...	14.39	1786...	14.96	1821...	15.95	1856...	15.38	1891...	20.92
1717....	15.13	1752...	14.54	1787...	14.92	1822...	15.80	1857...	15.27	1892...	23.72
1718....	15.11	1753...	14.54	1788...	14.65	1823...	15.84	1858.	15.38	1893...	26.49
1719....	15.09	1754...	14.48	1789...	14.75	1824...	15.82	1859...	15.19	1894...	32.56
1720....	15.04	1755...	14.68	1790...	15.04	1825 ..	15.70	1860...	15.29	1895 ..	31.60
1721....	15.05	1756...	14.94	1791...	15.05	1826...	15.76	1861..	15.50		

XXI.—IMPORTS INTO THE UNITED STATES OF GOLD AND SILVER ORE, BULLION, AND

Customs districts and ports.	GOLD.								Total.
	Contained in—		Total.	Ore.	Bullion		Coin		
	Base bullion.	Silver ore.					United States.	Foreign.	
	Value	Value.	Value.	Value.	Ounces.	Value	Value.	Value.	Value.
New York	$154,799	.....	$154,799	$13,365	491,633	$9,832,659	$6,377,070	$9,988,827	$26,366,720
Pittsburg	.....	.....	.....	.....	21	420	.....	.....	420
Champlain	.....	.....	.....	.....	3,435	68,707	2,181,305	272,107	2,522,119
Mobile	.....	.....	.....	.....	.....	.....	547	243	790
Niagara	.....	.....	.....	.....	.....	.....	107,817	.....	107,817
Vermont	.....	.....	.....	.....	60	1,200	.....	.....	1,200
Minnesota	109	.....	109	.....	.....	.....	.....	.....	109
Detroit	.....	.....	.....	.....	163	3,085	.....	.....	3,085
Saluria	51,036	$315	51,351	.....	.....	.....	9,167	.....	60,518
New Orleans	.....	.....	.....	.....	9,624	153,191	4,223	.....	157,414
Brazos de Santiago	.....	.....	.....	.....	.....	.....	.....	.....	.....
Omaha	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arizona	235,036	.....	235,036	.....	50,729	1,014,592	.....	.....	1,249,628
San Diego	.....	.....	.....	2,973	4,065	77,521	.....	.....	80,494
Perth Amboy	18,291	.....	18,291	.....	.....	.....	.....	.....	18,291
Puget Sound	.....	860,364	860,364	.....	.....	.....	.....	.....	860,364
Montana and Idaho	.....	.....	.....	.....	.....	.....	.....	.....	.....
Paso del Norte	.....	318,856	318,856	.....	18,598	371,975	.....	5,800	696,631
San Francisco	.....	172,394	172,394	30,375	40,223	865,301	153,650	487,967	1,709,687
Corpus Christi	13,146	.....	13,146	.....	17,873	375,711	105,285	5,013	499,155
Galveston	.....	.....	.....	.....	.....	.....	.....	.....	.....
Boston	.....	.....	.....	.....	1,866	35,072	.....	.....	35,072
Total	472,417	1,351,929	1,824,346	46,713	638,290	12,799,434	8,939,064	10,759,957	34,369,514

IMPORTS INTO THE UNITED STATES OF GOLD AND SILVER ORE, BULLION, AND

Countries from which imported.	GOLD.								Total.
	Contained in—		Total.	Ore	Bullion.		Coin.		
	Base bullion.	Silver ore.					United States.	Foreign.	
	Value.	Value.	Value.	Value.	Ounces.	Value.	Value.	Value.	Value.
Azores, and Madeira Islands	.....	.....	.....	.....	.....	.....	$26,013	.....	$26,013
France	.....	.....	.....	.....	(a)	$1,696,042	.....	$6,797,526	8,493,568
Germany	.....	.....	.....	.....	(a)	987,939	10	323,082	1,311,031
Italy	.....	.....	.....	.....	.....	.....	.....	.....	.....
United Kingdom	.....	.....	.....	$12,000	(a)	6,719,009	5,450,803	1,163,624	13,345,436
Bermuda	.....	.....	.....	.....	.....	.....	335	292	627
British Honduras	.....	.....	.....	.....	322	5,537	3,778	253	9,568
Dominion of Canada:									
Nova Scotia, New Brunswick, etc	.....	.....	.....	.....	1,770	33,415	.....	.....	33,415

a Weight not given.

COIN, BY CUSTOMS DISTRICTS, DURING CALENDAR YEAR ENDED DECEMBER 31, 1895.

SILVER.								Total.
Contained in—		Total.	Ore.	Bullion.		Coin.		
Base bullion.	Silver ore.					United States.	Foreign.	
Value.	Value.	Value.	Value.	Ounces.	Value.	Value.	Value.	Value.
$4,557,688	.....	$4,557,688	$163,347	1,369,717	$722,022	$89,376	$968,969	$6,501,402
1,272,854	.....	1,272,854	.....	.....	.....	.....	.....	1,272,854
.....	.....	.....	.....	.....	.....	3,185	4,457	7,642
.....	.....	.....	.....	.....	.....	365	20,274	20,639
.....	.....	.....	.....	.....	.....	2,800	.....	2,800
.....	.....	.....	.....	700	300	.....	.....	300
65,984	.....	65,984	.....	.....	.....	.....	.....	65,984
.....	.....	.....	.....	.....	.....	.....	.....	.....
355,927	$105,706	461,633	.....	.....	.....	235	229,439	691,307
.....	.....	.....	.....	.....	.....	4,055	293,861	297,916
.....	.....	.....	.....	.....	.....	.....	59,920	59,920
.....	495,980	495,980	.....	.....	.....	.....	.....	495,980
.....	990,951	990,951	.....	368,529	239,544	.....	.....	1,230,495
.....	.....	.....	.....	.....	.....	.....	1,538	1,538
1,969,709	.....	1,969,709	.....	.....	.....	.....	.....	1,969,709
78,704	305,952	384,656	.....	20,759	13,445	325	.....	398,426
.....	37,536	37,536	1,503	.....	.....	.....	.....	39,039
.....	2,784,185	2,784,185	.....	1,945,612	1,190,759	.....	5,020,954	8,995,898
.....	574,097	574,097	.....	1,992,589	1,216,460	3,545	707,374	2,501,476
94,833	.....	94,833	.....	146,527	95,329	.....	220,768	410,930
11,647	.....	11,647	.....	.....	.....	.....	.....	11,647
.....	.....	.....	.....	.....	.....	184	637	821
8,407,346	5,294,407	13,701,753	164,850	5,844,433	3,477,859	104,070	7,528,191	24,976,723

COIN, BY CERTAIN COUNTRIES, DURING CALENDAR YEAR ENDED DECEMBER 31, 1895.

SILVER.								Total.
Contained in—		Total.	Ore.	Bullion.		Coin.		
Base bullion.	Silver ore.					United States.	Foreign.	
Value.	Value.	Value.	Value.	Ounces.	Value.	Value.	Value.	Value.
.....	.....	.....	.....	.....	.....	$1,897	$58	$1,955
.....	.....	.....	$87	.....	.....	3,770	1,464	5,321
.....	.....	.....	.....	.....	.....	7,314	952	8,266
.....	.....	.....	.....	.....	.....	180	.....	180
.....	.....	.....	.....	.....	.....	17,514	38,243	55,757
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	7,535	272,929	280,464
.....	.....	.....	.....	.....	.....	184	300	484

XXI.—IMPORTS INTO THE UNITED STATES OF GOLD AND SILVER ORE,

Countries from which imported.	GOLD.								Total
	Contained in—		Total.	Ore.	Bullion.		Coin.		
	Base bullion.	Silver ore					United States.	Foreign.	
	Value.	Value.	Value.	Value.	Ounces.	Value.	Value.	Value.	Value.
Dominion of Canada—Continued.									
Quebec, Ontario, etc					151	$72,792	$2,289,122	$272,107	$2,634,021
British Columbia	$109	$860,364	$860,473		13,356	287,587			1,148,060
Newfoundland and Labrador								952	952
Central American States:									
Costa Rica					1,518	23,535	2,180		25,715
Guatemala					385	5,553			5,553
Honduras						43,566	1,321		44,887
Nicaragua				$650	9,003	178,136	6,800	800	186,386
Salvador						1,625	25,000		26,625
Mexico	472,308	491,565	963,873	33,348	118,561	2,435,296	207,947	34,217	3,674,681
West Indies:									
British				5			198,841	101,332	300,178
Danish							23,400	9,973	33,373
Dutch					(a)	3,176	20,307	1,910	25,393
French					(a)		4,385	12,933	17,318
Haiti							117,466		117,466
Santo Domingo					(a)	1,000	5,124	759	6,883
Spanish West Indies:									
Cuba							1,574	1,476,317	1,477,891
Puerto Rico					(a)	150	3,978	2,732	6,860
Brazil					(a)	5,419	800	2,684	8,903
Chile					(a)	500	2,763	53,900	57,163
Colombia					(a)	290,433	53,863	14,978	359,274
Ecuador					(a)	3,122		143	3,265
Guiana—Dutch					(a)	2,214		63	2,277
Peru				710	(a)	91			801
Venezuela					(a)	1,640	440,747	2,730	445,117
China									
Hongkong									
Japan							1,015		1,015
British Australasia							852	486,650	487,502
French Oceanica							640		640
Tonga, Samoa, etc									
Hawaiian Islands							50,000		50,000
Madagascar					96	1,657			1,657
Total	472,417	1,351,929	1,824,346	46,713		12,799,434	8,939,064	10,759,957	34,369,514

a Weight not given.

BULLION, AND COIN, BY CERTAIN COUNTRIES, ETC.—Continued.

SILVER.								
Contained in—		Total.	Ore.	Bullion.		Coin.		Total.
Base bullion	Silver ore.					United States.	Foreign.	
Value.	Value.	Value.	Value.	Ounces.	Value.	Value.	Value.	Value.
			$1,503	700	$300	$5,985	$4,457	$12,245
$144,688	$839,468	$984,156		20,759	13,445			997,601
							25,474	25,474
			1,910	307,572	167,181	172	45,590	214,853
							68,438	68,438
				261	135	27,000	16,690	43,825
8,262,658	4,454,939	12,717,597		5,353,012	3,213,644	7,272	6,287,879	22,226,392
						6,392	22,191	28,583
						2,400	21,271	23,671
						430	2,075	2,505
							3,743	3,743
						480	232,080	232,560
				3,325	1,490	2,196	25,212	28,898
						1,464	13,516	14,980
				816	500			500
			2,019					2,019
			2,655	157,285	80,744	7,771	409,293	500,463
				398	235	94	279	608
			156,676	305	185		30,999	187,860
						150	617	767
							290	290
						325		325
						2,500	421	2,921
						70	3,730	3,800
						975		975
8,407,346	5,294,407	13,701,753	164,850	5,844,433	3,477,859	104,070	7,528,191	24,976,723

XXII.—EXPORTS OF DOMESTIC GOLD AND SILVER ORE, BULLION, AND COIN FROM ... ENDED DECEM

Customs districts and ports.	GOLD.									
	Contained in—			Total value.	United States mint or assay office bars.		Other bullion.		Coin value.	Total value.
	Base bullion, value.	Silver ore, value.	Copper matte, value.		Ounces.	Value.	Ounces.	Value.		
New York	$2,710	.....	$43,786	$46,496	830,096	$17,139,568	21,176	$435,243	$71,107,885	$88,729,192
Champlain	.....	.....	.....	.....	271	7,600	.....	.....	3,358,550	3,366,150
Philadelphia	.....	.....	.....	.....	.....	.....	.....	.....	100,000	100,000
Bangor	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Niagara	.....	.....	.....	.....	.....	.....	3,902	78,054	712,560	790,614
Buffalo Creek	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermont	.....	.....	.....	.....	.....	.....	.....	.....	152,904	152,904
Baltimore	.....	.....	4,971	4,971	.....	.....	.....	.....	.....	4,971
Saluria	.....	.....	.....	.....	.....	.....	.....	.....	4,865	4,865
New Orleans	.....	.....	.....	.....	.....	.....	.....	.....	10,500	10,500
Puget Sound	.....	$956	.....	956	.....	.....	.....	.....	11,081	12,037
San Francisco	.....	.....	.....	.....	.....	.....	243	5,035	614,170	619,205
Total	2,710	956	48,757	52,423	830,367	17,147,168	25,321	518,332	76,072,515	93,790,438

CERTAIN CUSTOMS DISTRICTS OF THE UNITED STATES DURING THE CALENDAR YEAR BER 31, 1895.

SILVER.									
Contained in—			Total. value.	United States mint or assay office bars.		Other bullion.		Coin value.	Total value.
Base bullion, value.	Silver ore, value.	Copper matte, value.		Ounces.	Value.	Ounces.	Value.		
$940	.....	$332,209	$333,149	21,000	$14,600	57,461,442	$38,087,899	$750	$38,436,398
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	521	352	2,500	2,852
.....	.....	.....	.....	.....	.....	61,466	38,247	11,485	49,732
.....	.....	.....	.....	2,035	1,424	.....	.....	.....	1,424
.....	.....	.....	.....	.....	.....	1,249	844	227,763	228,607
.....	.....	44,766	44,766	.....	.....	.....	.....	.....	44,766
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	18	18	.....	.....	.....	.....	.....	18
.....	$419	.....	419	.....	.....	.....	.....	10,544	10,963
.....	.....	.....	.....	.....	.....	12,723,389	8,102,611	.....	8,102,611
940	419	376,993	378,352	23,035	16,024	70,248,067	46,229,953	253,042	46,877,371

EXPORTS TO CERTAIN COUNTRIES OF DOMESTIC GOLD AND SILVER ORE, BUL
DECEMBER

Countries to which exported.	GOLD.									
	Contained in—			Total value.	United States mint or assay office bars.		Other bullion.		Coin value.	Total value.
	Base bullion, value.	Silver ore, value.	Copper matte, value.		Ounces.	Value.	Ounces.	Value.		
Belgium									$250,000	$250,000
France					29,567	$591,400			11,325,000	11,916,400
Germany	$2,710			$2,710	186,342	3,818,183	372	$7,091	9,266,000	13,093,984
Italy							50	900		900
United Kingdom			$48,757	48,757	614,187	12,729,985	20,754	427,252	46,370,000	59,575,994
British Honduras									12,488	12,488
Dominion of Canada:										
Novia Scotia, New Brunswick, etc										
Quebec, Ontario, etc					271	7,600	3,902	78,054	4,224,014	4,309,668
British Columbia		$956		956					11,081	12,037
Newfoundland and Labrador									100,000	100,000
Central American States:										
Costa Rica									5,400	5,400
Guatemala									15,500	15,500
Nicaragua									1,000	1,000
Mexico									8,565	8,565
West Indies:										
British									6,000	6,000
Dutch									7,700	7,700
French									16,625	16,625
Haiti									949,078	949,078
Santo Domingo									77,828	77,828
Spanish—										
Cuba									10,000	10,000
Puerto Rico									1,400	1,400
Argentine Republic									1,700,000	1,700,000
Colombia									12,000	12,000
Ecuador										
Guiana—British									1,000	1,000
Venezuela									1,109,866	1,109,866
China										
East Indies—British										
Hongkong							243	5,035	116,840	121,875
Japan									5,130	5,130
Hawaiian Islands									470,000	470,000
Total	2,710	956	48,757	52,423	830,367	17,147,168	25,321	518,332	76,072,515	93,790,438

LION, AND COIN FROM THE UNITED STATES DURING THE CALENDAR YEAR ENDED 31, 1895.

SILVER.									
Contained in—			Total value.	United States mint or assay office bars.		Other bullion.		Coin value.	Total value.
Base bullion, value.	Silver ore, value.	Copper matte, value.		Ounces.	Value.	Ounces.	Value.		
						607,182	$410,700		$410,700
$940			$940			17,721	10,696		11,636
		$376,993	376,993	21,000	$14,600	55,658,344	36,875,706		37,267,299
						521	352	$2,500	2,852
				2,035	1,424	62,715	39,091	239,248	279,763
	$419		419					10,544	10,963
						1,255,894	836,615		836,615
								500	500
								200	200
								50	50
						271,309	181,002		181,002
						6,469,271	4,076,600		4,076,600
						149,800	100,600		100,600
						1,925,400	1,259,050		1,259,050
						3,829,910	2,439,541		2,439,541
940	419	376,993	378,352	23,035	16,024	70,248,067	46,229,953	253,042	46,877,371

XXIII.—EXPORTS OF FOREIGN GOLD AND SILVER FROM THE UNITED STATES, BY CUSTOMS DISTRICTS, DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

Customs districts.	GOLD COIN.	Total.	SILVER.			Total.
			Bullion.		Coin.	
			Ounces.	Value.		
New York	$11,176,960	$11,176,960	.....	.....	$1,608,057	$1,608,057
Champlain	.....	.....	.....	.....	48,505	48,505
Mobile	.....	.....	.....	.....	1,365	1,365
Vermont	.....	.....	.....	.....	64,143	64,143
Baltimore	.....	.....	.....	.....	2,478	2,478
Saluria	.....	.....	.....	.....	256,932	256,932
New Orleans	.....	.....	5,200	$3,300	11,962	15,262
Corpus Christi	.....	.....	.....	.....	6,491	6,491
Brazos de Santiago	.....	.....	.....	.....	15,088	15,088
Paso del Norte	.....	.....	343,897	202,600	16,727	219,327
San Francisco	.....	.....	.....	.....	5,075,146	5,075,146
Galveston	.....	.....	183,417	11,647	.....	11,647
Boston	.....	.....	.....	.....	12,000	12,000
Total	11,176,960	11,176,960	532,514	217,547	7,118,894	7,336,441

EXPORTS OF FOREIGN GOLD AND SILVER FROM THE UNITED STATES TO CERTAIN COUNTRIES DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

Countries to which exported.	GOLD COIN.	Total.	SILVER.			Total.
			Bullion.		Coin.	
			Ounces.	Value.		
France	$1,672,073	$1,672,073	.....	.....	.....	.....
Germany	754	754	.....	.....	$5,980	$5,980
United Kingdom	161,577	161,577	188,617	$14,947	805,008	819,955
Dominion of Canada: Quebec, Ontario, etc	.....	.....	.....	.....	112,648	112,648
Central American States:						
Honduras	.....	.....	.....	.....	9,401	9,401
Nicaragua	.....	.....	.....	.....	10,197	10,197
Salvador	.....	.....	.....	.....	925	925
Mexico	.....	.....	343,897	202,600	304,637	507,237
Miquelon, Langley, etc	.....	.....	.....	.....	12,000	12,000
West Indies:						
British	.....	.....	.....	.....	10,036	10,036
Dutch	.....	.....	.....	.....	5,108	5,108
Haiti	.....	.....	.....	.....	425	425
Santo Domingo	945	945	.....	.....	184,298	184,298
Spanish—Cuba	9,306,169	9,306,169	.....	.....	6,736	6,736
Brazil	.....	.....	.....	.....	59,128	59,128
Colombia	.....	.....	.....	.....	263,891	263,891
Ecuador	.....	.....	.....	.....	245,000	245,000
Peru	.....	.....	.....	.....	7,505	7,505
Venezuela	35,442	35,442	.....	.....	.....	.....
China	.....	.....	.....	.....	769,600	769,600
Hongkong	.....	.....	.....	.....	4,024,872	4,024,872
Japan	.....	.....	.....	.....	270,749	270,749
British Honduras	.....	.....	.....	.....	10,750	10,750
Total	11,176,960	11,176,960	532,514	217,547	7,118,894	7,336,441

XXIV.—Imports and Exports of the Precious Metals during the Calendar Year ended December 31, 1895.

RECAPITULATION.

Description.	Imports.	Exports.	Excess.	
			Imports.	Exports.
GOLD.				
Contained in base bullion	$472,417	$2,710	$469,707	.....
Contained in base silver ore	1,351,929	956	1,350,973	.....
Contained in copper matte	.....	48,757	.....	$48,757
Ore	46,713	.....	46,713	.....
Bars, United States Mint or assay office	.....	17,147,168	.....	17,147,168
Bullion, foreign	12,799,434	.....	12,799,434	.....
Bullion, domestic	.....	518,332	.....	518,332
Coin, foreign	10,759,957	11,176,960	.....	417,003
Coin, domestic	8,939,064	76,072,515	.....	67,133,451
Total	34,369,514	104,967,398	14,666,827	85,264,711
Excess of exports	.....	.....	.....	70,567,884
SILVER.				
Contained in base bullion	8,407,346	940	8,406,405	.....
Contained in base silver ore	5,294,407	419	5,293,988	.....
Contained in copper matte	.....	376,993	.....	376,993
Ore	164,850	.....	164,850	.....
Bars, United States Mint or assay office	.....	16,024	.....	16,024
Bullion, foreign	3,477,859	217,547	3,260,312	.....
Bullion, domestic	.....	46,229,953	.....	46,229,953
Coin, foreign	7,528,191	7,020,894	507,297	.....
Coin, domestic	104,070	351,042	.....	246,972
Total	24,976,723	54,213,812	17,632,852	46,869,942
Excess of exports	.....	.....	.....	29,237,090

XXV.—IMPORTS OF BASE BULLION AND ORE, AND GOLD, SILVER, COPPER, AND LEAD CONTAINED THEREIN, DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1895.

Description.	Quantity.	Value.
	Pounds.	
Base bullion	54,821,078	$9,408,619
Base silver ore	275,238,887	7,610,990
Copper bullion	766,370	35,696
Total	330,826,335	17,055,305
Gold.....ounces	1,253,144	1,824,346
Silver.....do	21,270,282	13,701,753
Lead.....pounds	92,649,678	1,142,059
Copper.....do	6,074,506	387,147
Total		17,055,305

XXVI.—COINAGE OF NATIONS.

Countries.	1893.		1894.		1895.	
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
United States	$56,997,020	$8,802,797	$79,546,160	$9,200,351	$59,616,358	$5,698,010
Mexico	493,167	28,005,396	554,107	29,481,033	504,193	24,832,351
Great Britain	45,094,210	5,296,728	27,633,807	4,002,657	18,547,229	5,776,584
Australasia	32,059,354	.....	35,203,648	.....	33,695,008	.....
India *a*	.....	39,544,591	.....	2,288,504	.....	4,044,935
France	9,832,068	.....	1,897,395	772,000	20,845,337	1,544,000
Germany	26,280,188	2,093,713	37,433,154	1,067,945	25,588,334	1,826,038
Russia *b*	2,315,493	2,499,874	2,315,481	233,861	38,590,432	3,696,192
Finland	.....	.....	.....	41,365	.....	.....
Austria-Hungary *c*	55,867,730	18,468,664	40,395,456	10,742,232	18,208,728	9,056,188
Italy	159,086	.....	.....	.....	.....	.....
Spain	.....	3,290,591	.....	3,946,225	.....	205,649
Japan	1,306,070	12,300,705	1,576,440	24,131,363	1,515,000	23,883,505
Portugal	.....	1,412,640	.....	478,440	.....	119,690
Netherlands	.....	562,800	70,897	160,800	135,692	140,700
Norway	.....	134,000	.....	120,600	.....	80,400
Sweden	.....	26,171	165,239	46,443	896,921	.....
Denmark	.....	.....	.....	121,593	.....	.....
Switzerland	386,000	.....	465,516	579,000	772,000	44,390
Turkey	736,989	874,628	84,403	450,018	3,420,717	414,483
Egypt	622,818	537,114	.....	.....	.....	.....
Abyssinia	.....	.....	.....	30,759	.....	.....
Persia	136,320	255,600	.....	.....	.....	.....
Hongkong	.....	1,500,000	.....	2,100,000	.....	2,200,000
China	.....	4,249,960	.....	6,000,000	.....	8,253,340
Indo-China	.....	939,906	.....	1,532,087	.....	6,092,709
Tunis	134,004	347	232	347	232	347
Canada	.....	160,000	.....	144,518	.....	.....
Newfoundland	.....	.....	.....	58,000	.....	.....
Costa Rica	.....	155,000	.....	12,517	.....	.....
Haiti	.....	.....	.....	718,753	.....	730,285

a Rupee calculated at coining rate, $0.4737.

b Silver ruble calculated at coining rate, $0.7718.

c Florin calculated at coining rate, $0.4052, under the coinage act of August 2, 1892.

XXVI.—Coinage of Nations—Continued.

Countries.	1893.		1894.		1895.	
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
Bolivia	.....	$1,569,229	.....	.....	.....	.....
Peru	.....	2,167,393	.....	$4,360,153	.....	$4,073,270
Colombia	.....	34,530	.....	8,252	.....	.....
Ecuador	.....	.....	.....	83,308	.....	1,102,073
Venezuela	.....	193,000	.....	193,000	.....	.....
Chile	.....	481,405	.....	121,779	$8,353,212	4,243,919
Urugnay	.....	1,000,110	.....	.....	.....	1,000,000
Gustemala	.....	100,000	.....	3,561,988	145	500,000
British Honduras	.....	.....	.....	50,000	.....	30,000
British West Indies	.....	.....	.....	9,733	.....	.....
Puerto Rico	.....	.....	.....	.....	.....	8,389,222
German East Africa	.....	45,348	.....	93,097	.....	.....
German New Guinea	.....	.....	.....	47,608	11,900	.....
Monaco	.....	.....	.....	.....	386,000	.....
Straits Settlements	.....	194,000	.....	306,000	.....	450,446
Congo State	.....	.....	.....	96,500	.....	.....
Morocco	.....	557,750	.....	327,337	.....	354,630
Bulgaria	.....	.....	$579,097	2,316,224	.....	.....
Roumania	.....	.....	.....	579,000	.....	.....
Ceylon	.....	473,700	.....	142,110	.....	236,850
Siam	.....	.....	.....	2,338,288	.....	2,589,823
Korea	.....	25,000	.....	.....	.....	.....
Total	$232,420,517	137,952,690	227,921,032	113,095,788	231,087,438	121,610,219

XXVII.—WORLD'S PRODUCTION OF GOLD AND

[Kilogram of gold, $664.60; kilogram of silver, $41.56,

Countries.	1893.			
	Gold.		Silver.	
	Kilos.	*Dollars.*	*Kilos.*	*Dollars.*
United States	54,100	35,955,000	1,866,595	77,575,700
Australasia	53,698	35,688,600	637,800	26,507,000
Mexico	1,964	1,305,300	1,380,116	57,357,600
European countries:				
Russia	41,842	27,808,200	10,117	420,500
Germany	[b] 2,305	1,531,900	179,000	7,438,200
Austria-Hungary	2,521	1,675,400	90,132	3,745,900
Sweden	93	62,000	4,471	185,800
Norway	.....	.....	[c] 4,495	186,800
Italy	176	117,000	28,885	1,200,500
Spain	.....	.....	62,632	2,603,000
Greece	.....	.....	2,025	84,200
Turkey	10	7,000	6,334	263,200
France	279	185,300	98,077	4,076,100
Great Britain	64	42,300	7,886	327,700
Dominion of Canada	[a] 1,395	927,200	[a] 7,734	321,400
South American countries:				
Argentina	211	140,200	22,026	915,400
Colombia	4,353	2,892,800	52,511	2,182,400
Bolivia	101	[a] 67,000	424,074	17,624,500
Ecuador	79	52,000	240	10,000
Chile	698	464,400	97,333	4,045,200
Brazil	3,339	2,219,500	.....	.....
Venezuela	[c] 1,213	806,100	.....	.....
Guiana (British)	3,863	2,567,400	.....	.....
Guiana (Dutch)	[a] 1,065	707,800	.....	.....
Guiana (French)	1,764	1,172,400	.....	.....
Peru	[f] 110	73,000	[c] 59,257	2,462,700
Uruguay	[a] 213	141,600	.....	.....
Central American States	[f] 246	163.500	48,123	[g] 2,000,000
Japan	[h] 728	484,000	[h] 57,978	2,409,600
China	10,372	[a] 6,892,900	.....	.....
Africa	43,550	28,943,500	.....	.....
India (British)	5,738	3,813,600	.....	.....
Korea	884	587,900	.....	.....
Total	236,974	157,494,800	5,147,841	213,944,400

[a] Estimate of the Bureau of the Mint.

[b] Gold separated from silver in Germany, whose gold contents do not figure in the statistics of any other country.

[c] Estimated the same as officially communicated for 1892.

[d] Estimated the same as officially communicated for 1893.

[e] Estimated the same as officially communicated for 1894.

SILVER FOR CALENDAR YEARS 1893, 1894, AND 1895.

coining rate in United States silver dollars.]

1894.				1895.			
Gold.		Silver.		Gold.		Silver.	
Kilos.	*Dollars.*	*Kilos.*	*Dollars.*	*Kilos.*	*Dollars.*	*Kilos.*	*Dollars.*
59,434	39,500,000	1,539,942	64,000,000	70,132	46,610,000	1,733,662	72,051,000
62,836	41,760,800	562,263	23,367,700	67,406	44,798,300	389,102	16,171,100
6,771	*a* 4,500,000	1,463,361	60,817,300	9,028	*a* 6,000,000	1,461,008	60,719,500
36,313	24,133,400	8,580	356,600	43,476	28,894,400	12,495	519,300
b 3,100	2,060,300	193,000	8,021,100	*b* 3,345	2,223,100	181,000	7,522,400
2,719	1,807,200	83,515	3,470,900	2,993	1,989,000	67,952	2,824,100
49	62,500	2,869	119,200	79	52,500	1,187	49,300	
.....	.....	4,705	195,500	.....	.....	6,082	252,800
d 176	117,000	*d* 28,885	1,200,500	*d* 176	117,000	*d* 28,885	1,200,500
.....	.....	63,605	2,643,400	.....	.....	109,804	4,563,500
.....	.....	35,436	1,472,700	.....	.....	*e* 35,436	1,472,700
12	8,000	1,516	63,000	*e* 12	8,000	*e* 1,516	63,000
.....	.....	26,167	1,087,500	.....	.....	*e* 26,167	1,087,500
99	65,800	7,932	329,700	161	107,000	8,722	362,500
1,568	1,042,100	26,371	1,096,000	2,875	1,910,900	55,241	2,295,800
143	95,000	37,334	1,551,600	*e* 143	95,000	*e* 37,334	1,551,600
d 4,353	2,892,800	*d* 52,511	2,182,400	*d* 4,353	2,892,800	*d* 52,511	2,182,400
101	*a* 67,000	684,418	28,444,400	101	*a* 67,000	*e* 684,418	28,444,400
103	68,400	*d* 240	10,000	*e* 103	68,400	*d* 240	10,000
698	*d* 464,400	88,680	3,685,500	2,118	1,407,600	156,542	6,505,900
3,339	2,219,500	.....	.....	*e* 3,339	2,219,500	.....	.....
1,368	909,500	.....	.....	*e* 1,368	909,500	.....	.....
3,476	2,310,100	.....	.....	3,330	2,213,100	.....	.....
979	*a* 650,800	.....	.....	734	487,800	.....	.....
3,920	2,605,200	.....	.....	*e* 3,920	2,605,200	.....	.....
112	74,400	100,695	4,184,900	96	63,800	98,401	4,089,500
a 23	15,400	.....	.....	41	27,200	.....	.....
708	470,500	48,123	*g* 2,000,000	*e* 708	470,500	48,123	*g* 2,000,000
i 737	489,800	*i* 60,869	2,529,700	*j* 778	517,100	*j* 67,355	2,799,300
12,875	*a* 8,556,800	.....	.....	5,298	3,521,000	.....	.....
60,595	40,271,000	.....	.....	67,040	44,554,900	.....	.....
5,842	3,882,900	.....	.....	7,156	4,755,900	.....	.....
703	467,200	.....	.....	1,052	699,200	.....	.....
273,197	181,567,800	5,121,017	212,829,600	301,361	200,285,700	5,263,183	218,738,100

f Estimated the same as officially communicated for 1891.
g Estimated the same as officially communicated for 1887.
h Product of Imperial mines, 1893; private mines, 1891.
i Product of Imperial mines, 1894; private mines, 1892.
j Product of Imperial mines, 1895; private mines, 1893.

XXVIII.—WORLD'S PRODUCTION OF GOLD AND

[Fine ounce of gold, $20.671834 + ; fine ounce of silver,

Countries.	1893.			
	Gold.		Silver.	
	Ozs. fine.	*Dollars.*	*Ozs. fine.*	*Dollars.*
United States	1,739,323	35,955,000	59,999,956	77,575,700
Australasia	1,726,436	35,688,600	20,501,508	26,507,000
Mexico	63,144	1,305,300	44 362,519	57,357,600
European countries:				
Russia	1 345,222	27,808,200	325,230	420,500
Germany	*b* 74,106	1,531,900	5,753,756	7,439,200
Austria-Hungary	81,047	1,675,400	2,897,219	3,745,900
Sweden	2,999	62,000	143,705	185,800
Norway	.....	.....	*c* 144,478	186,800
Italy	5,660	117,000	928,512	1,200,500
Spain	.....	.....	2,013,258	2,602,000
Greece	.....	.....	65,123	84,200
Turkey	339	7,000	203,569	263,200
France	8,964	185,300	3,152,609	4,076,100
Great Britain	2,046	42,300	253,455	327,700
Dominion of Canada	*a* 44,853	927,200	*a* 248,583	321,400
South American countries:				
Argentina	6,782	140,200	708,005	915,400
Colombia	139,939	2,892,800	1,687,950	2,182,400
Bolivia	3,241	*a* 67,000	13,631,449	17,624,500
Ecuador	2,515	52,000	7,734	10,000
Chile	22,466	464,400	3,128,709	4,045,200
Brazil	107,368	2,219,500	.....	.....
Venezuela	*c* 38,995	806,100	.....	.....
Guiana (British)	124,198	2,567,400	.....	.....
Guiana (Dutch)	*a* 34,240	707,800	.....	.....
Guiana (French)	56,715	1,172,400	.....	.....
Peru	*f* 3,531	73,000	*c* 1,904,744	2,462,700
Uruguay	*a* 6,850	141,600	.....	.....
Central American States	*f* 7,909	163,500	1,546,875	*g* 2,000,000
Japan	*h* 23,414	484,000	*h* 1,863,675	2,409,600
China	333,444	*a* 6,892,900	.....	.....
Africa	1,400,142	28,943,500	.....	.....
India (British)	184,483	3,813,600	.....	.....
Korea	28,440	587,900	.....	.....
Total	7,618,811	157,494,800	165,472,621	213,944,400

a Estimate of the Bureau of the Mint.

b Gold separated from silver in Germany, whose gold contents do not figure in the statistics of any other country.

c Estimated the same as officially communicated for 1892.

d Estimated the same as officially communicated for 1893.

e Estimated the same as officially communicated for 1894.

SILVER FOR CALENDAR YEARS 1893, 1894, AND 1895.

$1.292929 +, coining rate in United States silver dollars.]

1894.				1895.			
Gold.		Silver.		Gold.		Silver.	
Ozs. fine.	*Dollars.*	*Ozs. fine.*	*Dollars.*	*Ozs. fine.*	*Dollars.*	*Ozs. fine.*	*Dollars.*
1,910,813	39,500,000	49,500,000	64,000,000	2,254,760	46,610,000	55,726,945	72,051,000
2,020,179	41,760,800	18,073,455	23,367,700	2,167,118	44,798,300	12,507,335	16,171,100
217,688	*a* 4,500,000	47,038,381	60,817,300	290,250	*a* 6,000,000	46,962,738	60,719,500
1,167,453	24,133,400	275,808	356,600	1,397,767	28,894,400	401,646	519,300
b 99,667	2,060,300	6,203,820	8,021,100	*b* 107,542	2,223,100	5,818,106	7,522,400
87,423	1,807,200	2,684,524	3,470,900	96,218	1,989,000	2,184,265	2,824,100
3,024	62,500	92,194	119,200	2,540	52,500	38,130	49,300
.....	.....	151,207	195,500	.....	.....	195,525	252,800
d 5,660	117,000	*d* 928,512	1,200,500	*d* 5,660	117,000	*d* 928,512	1,200,500
.....	.....	2,044,505	2,643,400	.....	.....	3,529,582	4,563,500
.....	.....	1,139,041	1,472,700	.....	.....	*e* 1,139,041	1,472,700
387	8,000	48,727	63,000	*e* 387	8,000	*e* 48,727	63,000
.....	.....	841,113	1,087,500	.....	.....	*e* 841,113	1,087,500
3,183	65,800	255,002	329,700	*e* 5,176	107,000	280,371	362,500
50,411	1,042 100	847,687	1,096,000	92,440	1,910,900	1,775,658	2,295,800
4,596	95,000	1,200,066	1,551,600	*e* 4,596	95,000	*e* 1,200,066	1,551,600
d 139,939	2,892,800	*d* 1,687,950	2,182,400	*d* 139,939	2,892,800	*d* 1,687,950	2,182,400
3,241	*a* 67,000	21,999,966	28,444,400	3,241	*a* 67,000	*e* 21,999,966	28,444,400
3,309	68,400	*d* 7,734	10,000	*e* 3,309	68,400	*d* 7,734	10,000
22,466	*d* 464,400	2,850,503	3,685,500	68,092	1,407,600	5,031,907	6,505,900
107,368	2,219,500	.....	.....	*e* 107,368	2,219,500	.....	.....
43,997	909,500	.....	.....	*e* 43,997	909,500	.....	.....
111,751	2,310,100	.....	.....	107,059	2,213,100	.....	.....
a 31,482	650,800	.....	.....	23,597	487,800	.....	.....
126,026	2,605,200	.....	.....	*e* 126,026	2,605,200	.....	.....
3.599	74,400	3,236,759	4,184,900	3,086	63,800	3,162,973	4,089,500
745	15,400	.....	.....	1,316	27,200	.....	.....
22,760	470,500	1,546,875	*g* 2,000.000	*e* 22,760	470,500	1,546,875	*g* 2,000.000
i 23,694	489,800	*i* 1,956,565	2,529,700	*j* 25,015	517,100	*j* 2,165,084	2,799,300
413,937	*a* 8,556,800	.....	.....	170,328	3,521,000	.....	.....
1,948,109	40,271,000	.....	.....	2,155,343	44,554,900	.....	.....
187,835	3,882,900	.....	.....	230,067	4,755,900	.....	.....
22,600	467,200	.....	.....	33,824	699,200	.....	.....
8,783,342	181,567,800	164,610,394	212,829,600	9,688,821	200,285,700	169,180,249	218,738,100

f Estimated the same as officially communicated for 1891.
g Estimated the same as officially communicated for 1887.
h Product of Imperial mines, 1893; private mines, 1891.
i Product of Imperial mines, 1894; private mines, 1892.
j Product of Imperial mines, 1895; private mines, 1893.

XXIX.—PRODUCTION OF GOLD AND SILVER IN

[From 1493 to 1885 is from a table of averages for certain periods compiled by Dr. Adolph Soetbeer.

Period.	GOLD.			
	Annual average for period.		Total for period.	
	Fine ounces.	Value.	Fine ounces.	Value.
1493–1520	186,470	$3,855,000	5,221,160	$107,931,000
1521–1544	230,194	4,759,000	5,524,656	114,205,000
1545–1560	273,596	5,656,000	4,377,544	90,492,000
1561–1580	219,906	4,546,000	4,398,120	90,917,000
1581–1600	237,267	4,905,000	4,745,340	98,095,000
1601–1620	273,918	5,662,000	5,478,360	113,248,000
1621–1640	266,845	5,516,000	5,336,900	110,324,000
1641–1660	281,955	5,828,000	5,639,110	116,571,000
1661–1680	297,709	6,154,000	5,954,180	123,084,000
1681–1700	346,095	7,154,000	6,921,895	143,088,000
1701–1720	412,163	8,520,000	8,243,260	170,403,000
1721–1740	613,422	12,681,000	12,268,440	253,611,000
1741–1760	791,211	16,356,000	15,824,230	327,116,000
1761–1780	665,666	13,761,000	13,313,315	275,211,000
1781–1800	571,948	11,823,000	11,438,970	236,464,000
1801–1810	571,563	11,815,000	5,715,627	118,152,000
1811–1820	367,957	7,606,000	3,679,568	76,063,000
1821–1830	457,044	9,448,000	4,570,444	94,479,000
1831–1840	652,291	13,484,000	6,522,913	134,841,000
1841–1850	1,760,502	36,393,000	17,605,018	363,928,000
1851–1855	6,410,324	132,513,000	32,051,621	662,565,000
1856–1860	6,486,262	134,083,000	32,431,312	670,415,000
1861–1865	5,949,582	122,989,000	29,747,913	614,944,000
1866–1870	6,270,086	129,614,000	31,350,430	648,071,000
1871–1875	5,591,014	115,577,000	27,955,068	577,883,000
1876–1880	5,543,110	114,586,000	27,715,550	572,931,000
1881–1885	4,794,755	99,116,000	23,973,773	495,582,000
1886	5,135,679	106,163,900	5,135,679	106,163,900
1887	5,116,861	105,774,900	5,116,861	105,774,900
1888	5,330,775	110,196,900	5,330,775	110,196,900
1889	5,973,790	123,489,200	5,973,790	123,489,200
1890	5,749,306	118,848,700	5,749,306	118,848,700
1891	6,320,194	130,650,000	6,320,194	130,650,000
1892	7,094,266	146,651,500	7,094,266	146,651,500
1893	7,618,811	157,494,800	7,618,811	157,494,800
1894	8,783,342	181,567,800	8,783,342	181,567,800
1895	9,688,821	200,285,700	9,688 821	200,285,700
Total			424,816,562	8,781,738,400

THE WORLD SINCE THE DISCOVERY OF AMERICA.

For the years 1886 to 1895 the production is the annual estimate of the Bureau of the Mint.]

SILVER.				PERCENTAGE OF PRODUCTION.			
Annual average for period.		Total for period.		By weight.		By value.	
Fine ounces.	Coining value.	Fine ounces.	Coining value.	Gold.	Silver.	Gold.	Silver.
1,511,050	$1,954,000	42,309,400	$54,703,000	11	89	66.4	33.6
2,899,930	3,749,000	69,598,320	89,986,000	7.4	92.6	55.9	44.1
10,017,940	12,952,000	160,287,040	207,240,000	2.7	97.3	30.4	69.6
9,628,925	12,450,000	192,578,500	248,990,000	2.2	97.8	26.7	73.3
13,467,635	17,413,000	269,352,700	348,254,000	1.7	98.3	22	78
13,596,235	17,579,000	271,924,700	351,579,000	2	98	24.4	75.6
12,654,240	16,361,000	253,084,800	327,221,000	2.1	97.9	25.2	74.8
11,776,545	15,226,000	235,530,900	304,525,000	2.3	97.7	27.7	72.3
10,834,550	14,008,000	216,691,000	280,166,000	2.7	97.3	30.5	69.5
10,992,085	14,212,000	219,841,700	284,240,000	3.1	96.9	33.5	66.5
11,432,540	14,781,000	228,650,800	295,629,000	3.5	96.5	36.6	63.4
13,863,080	17,924,000	277,261,600	358,480,000	4.2	95.8	41.4	58.6
17,140,612	22,162,000	342,812,235	443,232,000	4.4	95.6	42.5	57.5
20,985,591	27,133,000	419,711,820	542,658,000	3.1	96.9	33.7	66.3
28,261,779	36,540,000	565,235,580	730,810,000	2	98	24.4	75.6
28,746,922	37,168,000	287,469,225	371,677,000	1.9	98.1	24.1	75.9
17,385,755	22,479,000	173,857,555	224,786,000	2.1	97.9	25.3	74.7
14,807,001	19,144,000	148,070,040	191,444,000	3	97	33	67
19,175,867	24,793,000	191,758,675	247,930,000	3.3	96.7	35.2	64.8
25,090,342	32,440,000	250,903,422	324,400,000	6.6	93.4	52.9	47.1
28,488,597	36,824,000	142,442,986	184,169,000	18.4	81.6	78.3	21.7
29,095,428	37,618,000	145,477,142	188,092,000	18.2	81.8	78.1	21.9
35,401,972	45,772,000	177,009,862	228,861,000	14.4	85.6	72.9	27.1
43,051,583	55,663,000	215,257,914	278,313,000	12.7	87.3	70	30
63,317,014	81,864,000	316,585,069	409,322,000	8.1	91.9	58.5	41.5
78,775,602	101,851,000	393,878,009	509,256,000	6.6	93.4	53	47
92,003,944	118,955,000	460,019,722	594,773,000	5	95	45.5	54.5
93,297,290	120,626,800	93,297,290	120,626,800	5.2	94.8	46.8	53.2
96,123,586	124,281,000	96,123,586	124,281,000	5	95	45.9	54.1
108,827,606	140,706,400	108,827,606	140,706,400	4.6	95.4	43.9	56.1
120,213,611	155,427,700	120,213,611	155,427,700	4.7	95.3	44.3	55.7
126,095,062	163,032,000	126,095,062	163,032,000	4.3	95.7	42.1	57.9
137,170,919	177,352,300	137,170,919	177,352,300	4.4	95.6	42.4	57.6
153,151,762	198,014,400	153,151,762	198,014,400	4.4	95.6	42.5	57.5
165,472,621	213,944,400	165,472,621	213,944,400	4.4	95.6	42.4	57.6
164,611,394	212,829,600	164,610,394	212,829,600	5	95	46.3	53.7
169,180,249	218,738,100	169,180,249	218,738,100	5.4	94.6	47.7	52.3
.....	.....	8,001,743,816	10,345,688,700	5	95	45.9	54.1

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES FROM THEIR ORGANIZATION, 1792, TO DECEMBER 31, 1895.

Denomination.	Pieces.	Value.
GOLD.		
Double eagles	62,793,341	$1,255,866,820.00
Eagles	26,627,549	266,275,490.00
Half eagles	44,042,271	220,211,355.00
Three-dollar pieces (coinage discontinued under act of September 26, 1890)	539,792	1,619,376.00
Quarter eagles	11,478,521	28,696,302.50
Dollars (coinage discontinued under act of September 26, 1890)	19,499,337	19,499,337.00
Total gold	164,980,811	1,792,168,680.50
SILVER.		
Dollars (coinage discontinued, act of February 12, 1873, and resumed under act of February 28, 1878)	431,320,867	[1] 431,320,867.00
Trade dollars	35,965,924	35,965,924.00
Half dollars	264,225,301	132,112,650.50
Half dollars, Columbian souvenir	5,002,105	2,501,052.50
Quarter dollars	201,714,255	50,428,563.75
Quarter dollars, Columbian souvenir	40,023	10,005.75
Twenty-cent pieces (coinage discontinued, act of May 2, 1878)	1,355,000	271,000.00
Dimes	288,352,593	28,835,259.30
Half dimes (coinage discontinued, act February 12, 1873)	97,604,388	4,880,219.40
Three-cent pieces (coinage discontinued, act February 12, 1873)	42,736,240	1,282,087.21
Total silver	1,368,316,696	687,607,629.46
MINOR.		
Five-cent pieces, nickel	281,054,494	14,052,724.70
Three-cent pieces, nickel (coinage discontinued, act September 26, 1890)	31,378,316	941,349.48
Two-cent pieces, bronze (coinage discontinued, act February 12, 1873)	45,601,000	912,020.00
One-cent pieces, copper (coinage discontinued, act February 21, 1857)	156,288,744	1,562,887.44
One-cent pieces, nickel (coinage discontinued, act April 22, 1864)	200,772,000	2,007,720.00
One-cent pieces, bronze	784,733,462	7,847,334.62
Half-cent pieces, copper (coinage discontinued, act February 21, 1857)	7,985,222	39,926.11
Total minor	1,507,813,238	27,363,963.35
Total coinage	3,041,110,745	2,507,140,272.25

[1] Silver-dollar coinage under act of—

April 2, 1792		$8,031,238
February 28, 1878	$378,166,793	
July 14, 1890	40,044,364	
March 31, 1891	5,078,472	
		423,289,629
Total		431,320,867

XXXI.—COINAGE OF FRACTIONAL AND SUBSIDIARY SILVER COINS, BY ACTS AND DENOMINATIONS, FROM 1792 TO 1895.

Denomination.	1792 to 1853.	1853 to Feb. 12, 1873.	Feb. 12, 1873, to Dec. 31, 1895.	Total silver.
Dollars	$2,506,890.00	$5,524,348.00	$423,289,629.00	$431,320,867.00
Trade dollars	.....	.....	35,965,924.00	35,965,924.00
Total dollars	2,506,890.00	5,524,348.00	459,255,553.00	467,286,791.00
Half dollars	66,280,640.50	32,666,832.50	33,165,177.50	132,112,650.50
Half dollars, Columbian	.....	.....	2,501,052.50	2,501,052.50
Quarter dollars	3,994,040.50	17,879,790.50	28,554,732.75	50,428,563.75
Quarter dollars, Columbian	.....	.....	10,005.75	10,005.75
Twenty-cent pieces	.....	.....	271,000.00	271,000.00
Dimes	3,890,230.10	4,908,520.00	20,036,509.20	28,835,259.30
Half dimes	1,825,126.40	3,055,093.00	.....	4,880,219.40
Three-cent pieces	744,927.00	537,160.20	.....	1,282,087.20
Total subsidiary	76,734,964.50	59,047,396.20	84,538,477.70	220,320,838.40
Total silver	79,241,854.50	64,571,744.20	543,794,030.70	687,607,629.40

Fractional silver coinage, 1792 to 1853	$76,734,964.50
Subsidiary silver coinage, 1853 to February 12, 1873	59,047,396.20
Subsidiary silver coinage, February 12, 1873, to December 31, 1895	84,538,477.70
Total	220,320,838.40

XXXII.—Coinage of the Mints of the United States

[Coinage of the mint at Philadelphia from

Calendar year.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1793 to 1795		$27,950	$43,535			
1796		60,800	16,995		$165.00	
1797		91,770	32,030		4,390.00	
1798		79,740	124,335		1,535.00	
1799		174,830	37,255		1,200.00	
1800		259,650	58,110			
1801		292,540	130,030			
1802		150,900	265,880		6,530.00	
1803		89,790	167,530		1,057.50	
1804		97,950	152,375		8,317.50	
1805			165,915		4,452.50	
1806			320,465		4,040.00	
1807			420,465		17,030.00	
1808			277,890		6,775.00	
1809			169,375			
1810			501,435			
1811			497,905			
1812			290,435			
1813			477,140			
1814			77,270			
1815			3,175			
1816						
1817						
1818			242,940			
1819			258,615			
1820			1,319,030			
1821			173,205		16,120.00	
1822			88,080			
1823			72,425			
1824			86,700		6,500.00	
1825			145,300		11,085.00	
1826			90,345		1,900.00	
1827			124,565		7,000.00	
1828			140,145			
1829			287,210		8,507.50	
1830			631,755		11,350.00	
1831			702,970		11,300.00	
1832			787,435		11,000.00	
1833			968,150		10,400.00	
1834			3,660,845		293,425.00	
1835			1,857,670		328,505.00	
1836			2,765,735		1,369,965.00	
1837			1,035,605		112,700.00	
1838		72,000	1,432,940		117,575.00	
1839		382,480	590,715		67,552.50	
1840		473,380	686,910		47,147.50	
1841		631,310	79,165			
1842		815,070	137,890		7,057.50	
1843		754,620	3,056,025		251,365.00	

NOTE.—Not susceptible of exact statement by years of actual date of coin, the registry of annual having been invariably completed within the year of the date of coin, as now required.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS.

its organization, 1793, to December 31, 1895.]

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	$204,791	$161,572.00	.....	.....	.....	$4,320.80	.....
.....	72,920	.....	$1,473.50	.....	$2,213.50	511.50	.....
.....	7,776	1,959.00	63.00	.....	2,526.10	2,226.35	.....
.....	327,536	.....	.....	.....	2,755.00	.....	.....
.....	423,515	.....	.....	.....	.....	.....	.....
.....	220,920	.....	.....	.....	2,176.00	1,200.00	.....
.....	54,454	15,144.50	.....	.....	3,464.00	1,695.50	.....
.....	41,650	14,945.00	.....	.....	1,097.50	650.50	.....
.....	66,064	15,857.50	.....	.....	3,304.00	1,892.50	.....
.....	19,570	78,259.50	1,684.50	.....	826.50	.....	.....
.....	321	105,861.00	30,348.50	.....	12,078.00	780.00	.....
.....	.....	419,788.00	51,531.00	.....	.....	.....	.....
.....	.....	525,788.00	55,160.75	.....	16,500.00	.....	.....
.....	.....	684,300.00	.....	.....	.....	.....	.....
.....	.....	702,905.00	.....	.....	4,471.00	.....	.....
.....	.....	638,138.00	.....	.....	635.50	.....	.....
.....	.....	601,822.00	.....	.....	6,518.00	.....	.....
.....	.....	814,029.50	.....	.....	.....	.....	.....
.....	.....	620,951.50	.....	.....	.....	.....	.....
.....	.....	519,537.50	.....	.....	42,150.00	.....	.....
.....	.....	.....	17,308.00	.....	.....	.....	.....
.....	.....	23,575.00	5,000.75	.....	.....	.....	.....
.....	.....	607,783.50	.....	.....	.....	.....	.....
.....	.....	980,161.00	90,293.50	.....	.....	.....	.....
.....	.....	1,104,000.00	36,000.00	.....	.....	.....	.....
.....	.....	375,561.00	31,861.00	.....	94,258.70	.....	.....
.....	.....	652,898.50	54,212.75	.....	118,651.20	.....	.....
.....	.....	779,786.50	16,020.00	.....	10,000.00	.....	.....
.....	.....	847,100.00	4,450.00	.....	44,000.00	.....	.....
.....	.....	1,752,477.00	.....	.....	.....	.....	.....
.....	.....	1,471,583.00	42,000.00	.....	51,000.00	.....	.....
.....	.....	2,002,090.00	.....	.....	.....	.....	.....
.....	.....	2,746,700.00	1,000.00	.....	121,500.00	.....	.....
.....	.....	1,537,600.00	25,500.00	.....	12,500.00	.....	.....
.....	.....	1,856,078.00	.....	.....	77,000.00	61,500.00	.....
.....	.....	2,382,400.00	.....	.....	51,000.00	62,000.00	.....
.....	.....	2,936,830.00	99,500.00	.....	77,135.00	62,135.00	.....
.....	.....	2,398,500.00	80,000.00	.....	52,250.00	48,250.00	.....
.....	.....	2,603,000.00	39,000.00	.....	48,500.00	68,500.00	.....
.....	.....	3,206,002.00	71,500.00	.....	63,500.00	74,000.00	.....
.....	.....	2,676,003.00	488,000.00	.....	141,000.00	138,000.00	.....
.....	1,000	3,273,100.00	118,000.00	.....	119,000.00	95,000.00	.....
.....	.....	1,814,910.00	63,100.00	.....	104,200.00	113,800.00	.....
.....	.....	1,773,000.00	208,000.00	.....	199,250.00	112,750.00	.....
.....	300	1,667,280.00	122,786.50	.....	105,311.50	53,457.50	.....
.....	61,005	717,504.00	47,031.75	.....	135,858.00	67,204.25	.....
.....	173,000	155,000.00	30,000.00	.....	162,250.00	57,500.00	.....
.....	184,618	1,006,382.00	22,000.00	.....	188,750.00	40,750.00	.....
.....	165,100	1,922,000.00	161,400.00	.....	137,000.00	58,250.00	.....

coinage being of coin delivered by coiners of mints within the given year, and these deliveries not

XXXII.—Coinage of the Mints of the United States

[Coinage of the mint at Philadelphia from

Calendar year.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1844	.....	$63, 610	$1, 701, 650	.....	$16, 960. 00	.....
1845	.....	261, 530	2, 065, 495	.....	227, 627. 50	.....
1846	.....	200, 950	1, 979, 710	.....	53, 995. 00	.....
1847	.....	8, 622, 580	4, 579, 905	.....	74, 535. 00	.....
1848	.....	1, 454, 840	1, 303, 875	.....	22, 215. 00	.....
1849	.....	6, 536, 180	665, 350	.....	58, 235. 00	$688, 567
1850	$23, 405, 220	2, 914, 510	322, 455	.....	632, 307. 50	421, 953
1851	41, 743, 100	1, 763, 280	1, 887, 525	.....	3, 431, 870. 00	3, 317, 671
1852	41, 060, 520	2, 731, 060	2, 869, 505	.....	2, 899, 202. 50	2, 045, 351
1853	25, 226, 520	2, 012, 530	1, 528, 850	.....	3, 511, 670. 00	4, 076, 051
1854	15, 157, 980	542, 500	803, 375	$415, 854	1, 490, 645. 00	1, 639, 445
1855	7, 293, 320	1, 217, 010	585, 490	151, 665	583, 700. 00	758, 289
1856	6, 597, 560	604, 900	989, 950	78, 030	960, 600. 00	1, 762, 936
1857	8, 787, 500	166, 060	490, 940	62, 673	535, 325. 00	774, 789
1858	4, 234, 280	25, 210	75, 680	6, 399	118, 442. 50	117, 995
1859	871, 940	160, 930	84, 070	46, 914	98, 610. 00	168, 244
1860	11, 563, 400	117, 830	99, 125	21, 465	56, 687. 50	36, 668
1861	59, 529, 060	1, 132, 330	3, 199, 750	18, 216	3, 181, 295. 00	527, 490
1862	1, 842, 660	109, 950	22, 325	17, 355	280, 882. 50	1, 326, 865
1863	2, 855, 800	12, 480	12, 360	15, 117	75. 00	6, 250
1864	4, 085, 700	35, 800	21, 100	8, 040	7, 185. 00	5, 950
1865	7, 024, 000	40, 050	6, 475	3, 495	3, 862. 50	3, 725
1866	13, 975, 500	37, 800	33, 600	12, 090	7, 775. 00	7, 180
1867	5, 021, 300	31, 400	34, 600	7, 950	8, 125. 00	5, 250
1868	1, 972, 000	106, 550	28, 625	14. 625	9, 062. 50	10, 525
1869	3, 503, 100	18, 550	8, 925	7, 575	10, 862. 50	5. 925
1870	3, 103, 700	25, 350	20, 175	10, 605	11, 387. 50	6, 335
1871	1, 603, 000	17, 800	16, 150	3, 990	13, 375. 00	3, 930
1872	5, 037, 600	16, 500	8, 450	6, 090	7, 575. 00	3, 530
1873	34, 196, 500	8, 250	562, 525	75	445, 062. 50	125, 125
1874	7, 336, 000	531, 600	17, 540	125, 460	9, 850. 00	198, 820
1875	5, 914, 800	1, 200	1, 100	60	1, 050. 00	420
1876	11, 678, 100	7, 320	7, 385	135	10, 552. 50	3, 245
1877	7, 953, 400	8, 170	5, 760	4, 464	4, 130. 00	3, 920
1878	10, 872, 900	738, 000	658, 700	246, 972	715. 650. 00	3, 020
1879	4, 152, 600	3, 847. 700	1, 509, 750	9, 090	222, 475. 00	3, 030
1880	1, 029, 120	16, 448, 760	15, 832, 180	3, 108	7, 490. 00	1, 636
1881	45, 200	38, 772, 600	28, 544, 000	1, 650	1, 700. 00	7, 660
1882	12, 600	23, 244, 800	12, 572, 800	4, 620	10, 100. 00	5, 040
1883	800	2, 067, 400	1, 167, 200	2, 820	4, 900. 00	10, 840
1884	1, 420	769, 050	955, 240	3, 318	4, 982. 50	6, 206
1885	16, 560	2, 535, 270	3, 007, 530	2, 730	2, 217. 50	12, 205
1886	22, 120	2, 361, 600	1, 942, 160	3, 426	10, 220. 00	6, 016
1887	2, 420	536, 800	435	18, 480	15, 705. 00	8, 543
1888	4, 525, 320	1, 329. 960	91, 480	15, 873	40, 245. 00	16, 080
1889	882, 220	44, 850	37, 825	7, 287	44, 120. 00	30, 729
1890	1, 519, 900	580. 430	21, 640	.....	22, 032. 50	.....
1891	28, 840	918, 680	307, 065	.....	27, 600. 00	.....
1892	90, 460	7, 975, 520	3, 767, 860	.....	6, 362. 50	.....
1893	6, 886, 780	18, 408, 950	7, 640, 985	.....	75, 265. 00	.....
1894	27, 379, 800	24, 707, 780	4, 789, 775	.....	10, 305. 00	.....
1895	22, 293, 120	5. 678, 260	6, 729, 680	.....	15, 297. 50	.....
Total	442, 325, 740	186, 877, 800	141, 288, 915	1, 357, 716	22, 772, 350. 00	18, 223, 438

[1] Includes Columbian souvenir half dollars, 1892, $475, 000.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1895.]

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	$20,000	$883,000.00	$105,300.00	.....	$7,250.00	$21,500.00	.....
.....	24,500	294,500.00	230,500.00	.....	175,500.00	78,200.00	.....
.....	110,600	1,105,000.00	127,500.00	.....	3,130.00	1,350.00	.....
.....	140,750	578,000.00	183,500.00	.....	24,500.00	63,700.00	.....
.....	15,000	290,000.00	36,500.00	.....	45,150.00	33,400.00	.....
.....	62,600	626,000.00	85,000.00	.....	83,900.00	65,450.00	.....
.....	7,500	113,500.00	47,700.00	.....	193,150.00	47,750.00	.....
.....	1,300	100,375.00	40,000.00	.....	102,650.00	39,050.00	$163,422.00
.....	1,100	38,565.00	44,265.00	.....	153,550.00	50,025.00	559,905.00
.....	46,110	1,766,354.00	3,813,555.00	.....	1,217,301.00	667,251.00	342,000.00
.....	33,140	1,491,000.00	3,095,000.00	.....	447,000.00	287,000.00	20,130.00
.....	26,000	379,750.00	714,250.00	.....	207,500.00	87,500.00	4,170.00
.....	63,500	469,000.00	1,816,000.00	.....	578,000.00	244,000.00	43,740.00
.....	94,000	994,000.00	2,411,000.00	.....	558,000.00	364,000.00	31,260.00
.....	.....	2,113,000.00	1,842,000.00	.....	154,000.00	175,000.00	48,120.00
.....	256,500	374,000.00	336,000.00	.....	43,000.00	17,000.00	10,950.00
.....	218,930	151,850.00	201,350.00	.....	60,700.00	39,950.00	8,610.00
.....	78,500	1,444,200.00	1,213,650.00	.....	192,400.00	164,050.00	14,940.00
.....	12,090	126,175.00	233,137.50	.....	84,755.00	74,627.50	10,906.50
.....	27,660	251,830.00	48,015.00	.....	1,446.00	923.00	643.80
.....	31,170	189,785.00	23,517.50	.....	3,907.00	23.50	14.10
.....	47,000	255,950.00	14,825.00	.....	1,050.00	675.00	255.00
.....	49,625	372,812.50	4,381.25	.....	872.50	536.25	681.75
.....	60,325	212,162.50	5,156.25	.....	662.50	431.25	138.75
.....	182,700	189,100.00	7,500.00	.....	46,625.00	4,295.00	123.00
.....	424,300	397,950.00	4,150.00	.....	25,660.00	10,430.00	153.00
.....	433,000	300,450.00	21,850.00	.....	47,150.00	26,830.00	120.00
.....	1,115,760	582,680.00	42,808.00	.....	75,361.00	74,443.00	127.80
.....	1,106,450	440,775.00	45,737.50	.....	239,645.00	147,397.50	58.50
$397,500	293,600	1,308,750.00	371,075.00	.....	394,710.00	35,630.00	18.00
987,800	.....	1,180,150.00	117,975.00	.....	294,070.00	.....	.....
218,900	.....	3,013,750.00	1,073,375.00	$7,940	1,035,070.00	.....	.....
456,150	.....	4,200,575.00	4,454,287.50	3,180	1,146,115.00	.....	.....
3,039,710	.....	4,152,255.00	2,727,927.50	102	731,051.00	.....	.....
900	10,509,550	689,200.00	565,200.00	120	167,880.00	.....	.....
1,541	14,807,100	2,950.00	3,675.00	.....	1,510.00	.....	.....
1,987	12,601,355	4,877.50	3,738.75	.....	3,735.50	.....	.....
960	9,163,975	5,487.50	3,243.75	.....	2,497.50	.....	.....
1,097	11,101,100	2,750.00	4,075.00	.....	391,110.00	.....	.....
979	12,291,039	4,519.50	3,859.75	.....	767,571.20	.....	.....
.....	14,070,875	2,637.50	2,218.75	.....	336,638.00	.....	.....
.....	17,787,767	3,065.00	3,632.50	.....	253,342.70	.....	.....
.....	19,963,886	2,943.00	1,471.50	.....	637,757.00	.....	.....
.....	20,290,710	2,855.00	2,677.50	.....	1,128,393.90	.....	.....
.....	19,183,833	6,416.50	2,708.25	.....	549,648.70	.....	.....
.....	21,726,811	6,355.50	3,177.75	.....	738,071.10	.....	.....
.....	16,802,590	6,295.00	20,147.50	.....	991,154.10	.....	.....
.....	8,694,206	100,300.00	980,150.00	.....	1,531,060.00	.....	.....
.....	1,037,245	[1]942,622.50	2,059,311.25	.....	1,212,124.50	.....	.....
.....	378,792	[2]2,939,448.50	[3]1,371,203.75	.....	334,079.20	.....	.....
.....	110,972	574,486.00	858,243.00	.....	133,097.20	.....	.....
.....	12,880	917,609.00	1,110,220.00	.....	69,088.00	.....	.....
5,107,524	217,542,936	87,801,224.50	34,551,967.50	11,312	19,838,219.10	3,948,791.90	1,260,487.20

[2] Includes Columbian souvenir half dollars, 1893, $2,026,052.50.
[3] Includes Columbian souvenir quarter dollars, 1893, $10,005.75.

XXXII.—Coinage of the Mints of the United States

[Coinage of the mint at Philadelphia from

Calendar year.	Minor coinage.		
	Five cents.	Three cents.	Two cents.
1793–1795			
1796			
1797			
1798			
1799			
1800			
1801			
1802			
1803			
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1840			
1841			
1842			
1843			

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1895.]

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
$10,660.33	$712.67	$71,485.00	$370,683.80	$11,373.00	$453,541.80
9,747.00	577.40	77,960.00	77,118.50	10,324.40	165,402.90
8,975.10	535.24	128,190.00	14,550.45	9,510.34	152,250.79
9,797.00	.....	205,610.00	330,291.00	9,797.00	545,698.00
9,045.85	60.83	213,285.00	423,515.00	9,106.68	645,906.68
28,221.75	1,057.65	317,760.00	224,296.00	29,279.40	571,335.40
13,628.37	.....	422,570.00	74,758.00	13,628.37	510,956.37
34,351.00	71.83	423,310.00	58,343.00	34,422.83	516,075.83
24,713.53	489.50	258,377.50	87,118.00	25,203.03	370,698.53
7,568.38	5,276.56	258,642.50	100,340.50	12,844.94	371,827.94
9,411.16	4,072.32	170,367.50	149,388.50	13,483.48	333,239.48
3,480.00	1,780.00	324,505.00	471,319.00	5,260.00	801,084.00
7,272.21	2,380.00	437,495.00	597,448.75	9,652.21	1,044,595.96
11,090.00	2,000.00	284,665 00	684,300.00	13,090.00	982,055.00
2,228.67	5,772.86	169,375.00	707,376.00	8,001.53	884,752.53
14,585.00	1,075.00	501,435.00	638,773.50	15,660.00	1,155,868.50
2,180.25	315.70	497,905.00	608,340.00	2,495.95	1,108,740.95
10,755.00	.....	290,435.00	814,029.50	10,755.00	1,115,219.50
4,180.00	.....	477,140.00	620,951.50	4,180.00	1,102,271 50
3,578.30	.....	77,270.00	561,687.50	3,578.30	642,535.80
.....	.....	3,175.00	17,308.00	.....	20,483.00
28,209.82	.....	.....	28,575.75	28,209.82	56,785.57
39,484.00	.....	.....	607,783.50	39,484.00	647,267.50
31,670.00	.....	242,940.00	1,070,454.50	31,670.00	1,345,064.50
26,710.00	.....	258,615.00	1,140,000.00	26,710.00	1,425,325,00
44,075.50	.....	1,319,030.00	501,680.70	44,075.50	1,864,786.20
3,890.00	.....	189,325.00	825,762.45	3,890.00	1,018,977.45
20,723.39	.....	88,980.00	805,806.50	20,723,39	915,509.89
.....	.....	72,425.00	895,550.00	.....	967,975.00
12,620.00	.....	93,200.00	1,752,477.00	12,620.00	1,858,297.00
14,611.00	315.00	156,385.00	1,564,583.00	14,926.00	1,735,894.00
15,174.25	1,170.00	92,245.00	2,002,090.00	16,344.25	2,110,679.25
23,577.32	.....	131,565.00	2,869,200.00	23,577.32	3,024,342.32
22,606.24	3,030.00	140,145.00	1,575,600.00	25,636.24	1,741,381.24
14,145.00	2,435.00	295,717.50	1,994,578.00	16,580.00	2,306,875.50
17,115.00	.....	643,105.00	2,495,400.00	17,115.00	3,155,620.00
33,592.60	11.00	714,270.00	3,175,600.00	33,603.60	3,923,473.60
23,620.00	.....	798,435.00	2,579,000.00	23,620.00	3,401,055.00
27,390.00	770.00	978,550.00	2,759,000.00	28,160.00	3,765,710.00
18,551.00	600.00	3,954,270.00	3,415,002.00	19,151.00	7,388,423.00
38,784.00	705.00	2,186,175.00	3,443,003.00	39,489.00	5,668,667.00
21,110.00	1,990.00	4,135,700.00	3,606,100.00	23,100.00	7,764,900.00
55,583.00	.....	1,148,305.00	2,096,010.00	55,583.00	3,299,898.00
63,702.00	.....	1,622,515.00	2,293,000.00	63,702.00	3,979,217.00
31,286.61	.....	1,040,747.50	1,949,135.50	31,286.61	3,021,169.61
24,627.00	.....	1,207,437.50	1,028,603.00	24,627.00	2,260,667.50
15,973.67	.....	710,475.00	577,750.00	15,973.67	1,304,198.67
23,833.90	.....	960,017.50	1,442,500.00	23,833.90	2,426,351.40
24,283.20	.....	4,062,010.00	2,443,750.00	24,283.20	6,530,043.20

XXXII.—Coinage of the Mints of the United States

[Coinage of the mint at Philadelphia from

Calendar year.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1844			
1845			
1846			
1847			
1848			
1849			
1850			
1851			
1852			
1853			
1854			
1855			
1856			
1857			
1858			
1859			
1860			
1861			
1862			
1863			
1864			$396,950.00
1865		$341,460.00	272,800.00
1866	$737,125.00	144,036.00	63,540.00
1867	1,545,475.00	117,450.00	58,775.00
1868	1,440,850.00	97,560.00	56,075.00
1869	819,750.00	48,120.00	30,930.00
1870	240,300.00	40,050.00	17,225.00
1871	28,050.00	18,120.00	14,425.00
1872	301,800.00	25,860.00	1,300.00
1873	227,500.00	35,190.00	
1874	176,900.00	23,700.00	
1875	104,850.00	6,840.00	
1876	126,500.00	4,860.00	
1877			
1878	117.50	70.50	
1879	1,455.00	1,236.00	
1880	997.75	748.65	
1881	3,618.75	32,417.25	
1882	573,830.00	759.00	
1883	1,148,471.05	318.27	
1884	563,697.10	169.26	
1885	73,824.50	143.70	
1886	166,514.50	128.70	
1887	763,182.60	238.83	
1888	536,024.15	1,232.49	
1889	794,068.05	646 83	
1890	812,963.60		
1891	841,717.50		
1892	584,982.10		
1893	668,509.75		
1894	270,656.60		
1895	498,994.20		
Total	14,052,724.70	941,349.48	912,020.00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1895.]

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
$23,987.52	.....	$1,782,220.00	$1,037,050.00	$23,987.52	$2,843,257.52
38,948.04	.....	2,574,652.50	803,200.00	38,948.04	3,416,800.54
41,208.00	.....	2,234,655.00	1,347,580.00	41,208.00	3,623,443.00
61,836.69	.....	13,277,020.00	990,450.00	61,836.69	14,329,306.69
64,157.99	.....	2,780,930.00	420,050.00	64,157.99	3,265,137.99
41,785.00	$199.32	7,948,332.00	922,950.00	41,984.32	8,913,266.32
44,268.44	199.06	27,756,445.50	409,600.00	44,467.50	28,210,513.00
98,897.07	738.36	52,143,446.00	446,797.00	99,635.43	52,689,878.43
50,630.94	.....	51,505,638.50	847,410.00	50,630.94	52,403,679.44
66,411.31	648.47	36,355,621.00	7,852,571.00	67,059.78	44,275,251.78
42,361.56	276.79	20,049,799.00	5,373,270.00	42,638.35	25,465,707.35
15,748.29	282.50	10,594,454.00	1,419,170.00	16,030.79	12,029,654.79
26,904.63	202.15	10,993,976.00	3,214,240.00	27,106.78	14,235,322.78
177,834.56	175.90	10,817,287.00	4,452,260.00	178,010.46	15,447,557.46
246,000.00	.....	4,578,006.50	4,332,120.00	246,000.00	9,156,126.50
364,000.00	.....	1,430,708.00	1,037,450.00	364,000.00	2,832,158.00
205,660.00	.....	11,885,175.50	681,390.00	205,660.00	12,772,225.50
101,000.00	.....	67,588,150.00	3,107,740.00	101,000.00	70,796,890.00
280,750.00	.....	3,600,037.50	541,691.50	280,750.00	4,422,479.00
498,400.00	.....	2,902,082.00	330,517.80	498,400.00	3,730,999.80
529,737.14	.....	4,163,775.00	248,417.10	926,687.14	5,338,879.24
354,292.86	.....	7,081,607.50	319,755.00	968,552.86	8,369,915.36
98,265.00	.....	14,073,945.00	428,909.25	1,042,960.00	15,545,814.25
98,210.00	.....	5,108,625.00	278,876.25	1,819,910.00	7,207,411.25
102,665.00	.....	2,141,387.50	430,343.00	1,697,150.00	4,268,880.50
64,200.00	.....	3,554,037.50	862,643.00	963,000.00	5,380,580.50
52,750.00	.....	3,177,552.50	829,400.00	350,325.00	4,357,277.50
89,295.00	.....	1,658,245.00	1,891,179.80	99,890.00	3,649,314.80
40,420.00	.....	5,079,745.00	1,980,063.50	369,380.00	7,429,188.50
116,765.00	.....	35,337,537.50	2,801,283.00	379,455.00	38,518,275.50
141,875.00	.....	8,219,270.00	2,579,995.00	342,475.00	11,141,740.00
135,280.00	.....	5,918,630.00	5,349,035.00	246,970.00	11,514,635.00
79,440.00	.....	11,706,737.50	10,269,307.50	210,800.00	22,186,845.00
8,525.00	.....	7,979,844.00	10,651,045.50	*8,525.00	18,639,414.50
57,998.50	.....	13,235,242.00	11,932,850.00	58,186.50	25,226,278.50
162,312.00	.....	9,744,645.00	14,816,776.00	165,003.00	24,726,424.00
389,649.55	.....	33,322,294.00	12,615,693.75	391,395.95	46,329,383.70
392,115.75	.....	67,372,810.00	9,176,163.75	428,151.75	76,977,125.50
385,811.00	.....	95,849,960.00	11,500,132.00	960,400.00	48,310,492.00
455,961.09	.....	3,273,960.00	13,067,968.45	1,604,770.41	17,946,698.86
232,617.42	.....	1,740,216.50	14,412,369.25	796,483.78	16,949,069.53
117,653.84	.....	5,576,512.50	18,047,807.20	191,622.04	23,815,941.74
176,542.90	.....	4,345,542.00	20,606,057.50	343,186.10	25,294,785.60
452,264.83	.....	582,383.00	21,424,636.40	1,215,686.26	23,222,705.66
374,944.14	.....	6,018,958.00	19,742,606.45	912,200.78	26,673,765.23
488,693.61	.....	1,047,031.00	22,474,415.35	1,283,408.49	24,804,854.84
571,828.54	.....	2,144,002.50	17,820,186.60	1,384,792.14	21,348,981.24
470,723.50	.....	1,282,185.00	11,305,716.00	1,312,441.00	13,900,342.00
376,498.32	.....	11,840,202.50	5,251,303.25	961,480.42	18,052,986.17
466,421.95	.....	33,011,980.00	5,023,523.45	1,134,931.70	39,170,435.15
167,521.32	.....	56,887,660.00	1,676,798.20	438,177.92	59,002,638.12
383,436.36	.....	24,716,357.50	2,109,797.00	882,430.50	37,708,585.08
11,417,942.06	*39,926.11*	812,845,959.00	370,002,492.20	27,363,962.35	1,210,272,413.55

XXXII.—Coinage of the Mints of the United States

[Coinage of the mint at New Orleans from its organization, 1838, to

Calendar year.	GOLD.						SILVER.
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	Dollars.
1838	.....	.....	.....	.....	.....	.....	.....
1839	.....	.....	.....	.....	$44,452.50	.....	.....
1840	.....	.....	$152,000	.....	65,500.00	.....	.....
1841	.....	$25,000	41,750	.....	18,450.00	.....	.....
1842	.....	274,000	82,000	.....	49,500.00	.....	.....
1843	.....	1,751,620	505,375	.....	920,005.00	.....	.....
1844	.....	1,187,000	1,823,000	.....	.....	.....	.....
1845	.....	475,000	205,000	.....	.....	.....	.....
1846	.....	817,800	290,000	.....	165,000.00	.....	$59,000
1847	.....	5,715,000	60,000	.....	310,000,00	.....	.....
1848	.....	358,500	.....	.....	.....	.....	.....
1849	.....	239,000	.....	.....	.....	$215,000	.....
1850	$2,820,000	575,000	.....	.....	210,000.00	14,000	40,000
1851	6,300,000	2,630,000	205,000	.....	370,000.00	290,000	.....
1852	3,800,000	180,000	.....	.....	350,000.00	140,000	.....
1853	1,420,000	510,000	.....	.....	.....	290,000	.....
1854	65,000	525,000	23,000	$72,000	382,500.00	.....	.....
1855	160,000	180,000	55,500	.....	.....	55,000	.....
1856	45,000	145,000	50,000	.....	52,750.00	.....	.....
1857	600,000	55,000	65,000	.....	85,000.00	.....	.....
1858	705,000	200,000	.....	.....	.....	.....	.....
1859	182,000	23,000	.....	.....	.....	.....	360,000
1860	132,000	111,000	.....	.....	.....	.....	515,000
1861[1]	100,000	.....	.....	.....	.....	.....	.....
1879	46,500	15,000	.....	.....	.....	.....	2,887,000
1880	.....	92,000	.....	.....	.....	.....	5,305,000
1881	.....	83,500	.....	.....	.....	.....	5,708,000
1882	.....	108,200	.....	.....	.....	.....	6,090,000
1883	.....	8,000	.....	.....	.....	.....	8,725,000
1884	.....	.....	.....	.....	.....	.....	9,730,000
1885	.....	.....	.....	.....	.....	.....	9,185,000
1886	.....	.....	.....	.....	.....	.....	10,710,000
1887	.....	.....	.....	.....	.....	.....	11,550,000
1888	.....	213,350	.....	.....	.....	.....	12,150,000
1889	.....	.....	.....	.....	.....	.....	11,875,000
1890	.....	.....	.....	.....	.....	.....	10,701,000
1891	.....	.....	.....	.....	.....	.....	7,954,529
1892	.....	286,880	50,000	.....	.....	.....	2,744,000
1893	.....	170,000	550,000	.....	.....	.....	300,000
1894	.....	1,075,000	83,000	.....	.....	.....	1,723,000
1895	.....	980,000	.....	.....	.....	.....	450,000
Total	16,375,500	19,008,850	4,447,625	72,000	3,023,157.50	1,004,000	118,761,529

[1] No coinage from 1862 to 1878, inclusive.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its suspension, 1861, and from its reopening, 1879, to December 31, 1895.]

SILVER.					TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Dimes.	Half dimes.	Three cents.	Gold.	Silver.	
.....	.....	$40,243.40	.....	.....	.....	$40,243.40	$40,243.40
$81,488	.....	124,327.20	$54,827.50	.....	$44,452.50	260,642.70	305,095.20
427,550	$106,300	117,500.00	46,750.00	.....	217,500.00	698,100.00	915,600.00
200,500	113,000	200,750.00	40,750.00	.....	85,200 00	555,000.00	640,200.00
478,500	192,250	202,000.00	17,500.00	.....	405,500.00	890,250.00	1,295,750.00
1,134,000	242,000	15,000.00	.....	.....	3,177,000.00	1,391,000.00	4,568,000.00
1,002,500	185,000	.....	11,000.00	.....	3,010,000.00	1,198,500.00	4,208,500.00
1,047,000	.....	23,000.00	.....	.....	680,000.00	1,070,000.00	1,750,000.00
1,152,000	.....	.....	.....	.....	1,272,800.00	1,211,000.00	2,483,800.00
1,292,000	92,000	.....	.....	.....	6,085,000.00	1,384,000.00	7,469,000.00
1,590,000	.....	.....	30,000.00	.....	358,500.00	1,620,000.00	1,978,500.00
1,155,000	.....	30,000.00	7,000.00	.....	454,000.00	1,192,000.00	1,646,000.00
1,228,000	103,000	51,000.00	34,500.00	.....	3,619,000.00	1,456,500.00	5,075,500.00
201,000	22,000	40,000.00	43,000.00	$21,600	9,795,000.00	327,600.00	10,122,600.00
72,000	24,000	43,000.00	13,000.00	.....	4,470,000.00	152,000.00	4,622,000.00
664,000	333,000	110,000.00	118,000.00	.....	2,220,000.00	1,225,000.00	3,445,000.00
2,620,000	371,000	177,000.00	78,000,00	.....	1,274,500.00	3,246,000.00	4,520,500.00
1,844,000	44,000	.....	30,000.00	.....	450,500.00	1,918,000.00	2,368,500.00
1,329,000	242,000	118,000.00	55,000.00	.....	292,750.00	1,744,000.00	2,036,750.00
409,000	295,000	154,000.00	69,000.00	.....	805,000.00	927,000.00	1,732,000.00
3,647,000	130,000	29,000.00	83,000.00	.....	905,000.00	3,889,000.00	4,794,000.00
1,417,000	65,000	48,000.00	28,000.00	.....	205,000.00	1,918,000.00	2,123,000.00
645,000	97,000	4,000.00	53,000.00	.....	243,000.00	1,314,000.00	1,557,000.00
165,000	.....	.....	.....	.....	100,000.00	165,000.00	265,000.00
.....	.....	.....	.....	.....	61,500.00	2,887,000.00	2,948,500.00
.....	.....	.....	.....	.....	92,000.00	5,305,000.00	5,397,000.00
.....	.....	.....	.....	.....	83,500.00	5,708,000.00	5,791,500.00
.....	.....	.....	.....	.....	108,200.00	6,090,000.00	6,198,200.00
.....	.....	.....	.....	.....	8,000.00	8,725,000.00	8,733,000.00
.....	.....	.....	.....	.....	.....	9,730,000.00	9,730,000.00
.....	.....	.....	.....	.....	.....	9,185,000.00	9,185,000.00
.....	.....	.....	.....	.....	.....	10,710,000.00	10,710,000.00
.....	.....	.....	.....	.....	.....	11,550,000.00	11,550,000.00
.....	.....	.....	.....	.....	213,350.00	12,150,000.00	12,363,350.00
.....	.....	.....	.....	.....	....	11,875,000.00	11,875,000.00
.....	.....	.....	.....	.....	.....	10,701,000.00	10,701,000.00
.....	17,000	454,000.00	.....	.....	.....	8,425,529.00	8,425,529.00
195,000	660,000	384,170.00	.....	.....	336,880.00	3,983,170.00	4,320,050.00
694,500	849,000	176,000.00	.....	.....	720,000.00	2,019,500.00	2,739,500.00
1,069,000	713,000	72,000.00	.....	.....	1,158,000.00	3,577,000.00	4,735,000.00
883,000	704,000	44,000.00	.....	.....	980,000.00	2,081,000.00	3,061,000.00
26,643,038	5,599,550	2,656,990.60	812,327.50	21,600	43,931,132.50	154,495,035.10	198,426,167.60

XXXII.—COINAGE OF THE MINTS OF THE UNITED STATES FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

[Coinage of the mint at Charlotte, N. C., from its organization, 1838, to its suspension, 1861.]

Calendar year.	GOLD.			TOTAL VALUE.
	Half eagles.	Quarter eagles.	Dollars.	
1838	$64,565	$19,770.00	.....	$84,335.00
1839	117,335	45,432.50	.....	162,767.50
1840	95,140	32,095.00	.....	127,235.00
1841	107,555	25,742.50	.....	133,297.50
1842	137,400	16,842.50	.....	154,242.50
1843	221,765	65,240.00	.....	287,005.00
1844[1]	118,155	29,055.00	.....	147,210.00
1845	.....	.....	.....	.....
1846	64,975	12,020.00	.....	76,995.00
1847	420,755	58,065.00	.....	478,820.00
1848	322,360	41,970.00	.....	364,330.00
1849	324,115	25,550.00	$11,634	361,299.00
1850	317,955	22,870.00	6,966	347,791.00
1851	245,880	37,307.50	41,267	324,454.50
1852	362,870	24,430.00	9,434	396,734.00
1853	327,855	.....	11,515	339,370.00
1854	196,455	18,237.50	4	214,696.50
1855	198,940	9,192.50	9,803	217,935.50
1856	142,285	19,782.50	.....	162,067.50
1857	156,800	.....	13,280	170,080.00
1858	194,280	22,640.00	.....	216,920.00
1859	159,235	.....	5,235	164,470.00
1860	74,065	18,672.50	.....	92,737.50
1861	34,395	.....	.....	34,395.00
Total	4,405,135	544,915.00	109,138	5,059,188.00

[1] Mint burned July 27, 1844.

XXXII.—COINAGE OF THE MINTS OF THE UNITED STATES FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

[Coinage of the mint at Dahlonega, Ga., from its organization, 1838, to its suspension, 1861.]

Calendar year.	GOLD.				TOTAL VALUE.
	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	
1838	$102,915				$102,915.00
1839	94,695		$34,185.00		128,880.00
1840	114,480		8,830.00		123,310.00
1841	152,475		10,410.00		162,885.00
1842	298,040		11,607.50		309,647.50
1843	492,260		90,522.50		582,782.50
1844	444,910		43,330.00		488,240.00
1845	453,145		48,650.00		501,795.00
1846	401,470		48,257.50		449,727.50
1847	322,025		39,460.00		361,485.00
1848	237,325		34,427.50		271,752.50
1849	195,180		27,362.50	$21,588	244,130.50
1850	219,750		30,370.00	8,382	258,502.00
1851	313,550		28,160.00	9,882	351,592.00
1852	457,260		10,195.00	6,360	473,815.00
1853	448,390		7,945.00	6,583	462,918.00
1854	282,065	$3,360	4,400.00	2,935	292,760.00
1855	112,160		2,807.50	1,811	116,778.50
1856	98,930		2,185.00	1,460	102,575.00
1857	85,230		5,910.00	3,533	94,673.00
1858	76,810			3,477	80,287.00
1859	51,830		5,610.00	4,952	62,392.00
1860	73,175			1,566	74,741.00
1861	7,985				7,985.00
Total	5,536,055	3,360	494,625.00	72,529	6,106,569.00

XXXII.—Coinage of the Mints of the United States

[Coinage of the mint at San Francisco

Calendar year.	GOLD.						SILVER.	
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	Dollars.	Trade dollars.
1854	$2,829,360	$1,238,260	$1,340	.....	$615	$14,632	.....	.....
1855	17,593,500	90,000	305,000	$19,800	.....	.....	.....	.....
1856	23,795,000	680,000	525,500	103,500	177,800	24,600	.....	.....
1857	19,410,000	260,000	435,000	42,000	170,000	10,000	.....	.....
1858	16,934,200	118,000	93,000	.....	3,000	10,000	.....	.....
1859	12,728,900	70,000	66,100	.....	38,000	15,000	$20,000	.....
1860	10,899,000	50,000	106,000	21,000	89,000	13,000	.....	.....
1861	15,360,000	155,000	90,000	.....	60,000	.....	.....	.....
1862	17,083,460	125,000	47,500	.....	20,000	.....	.....	.....
1863	19,331,400	100,000	85,000	.....	27,000	.....	.....	.....
1864	15,873,200	25,000	19,440	.....	.....	.....	.....	.....
1865	20,850,000	167,000	138,060	.....	52,440	.....	.....	.....
1866	16,845,000	200,000	219,600	.....	97,400	.....	.....	.....
1867	18,415,000	90,000	145,000	.....	70,000	.....	.....	.....
1868	16,750,000	135,000	260,000	.....	85,000	.....	.....	.....
1869	13,735,000	64,300	155,000	.....	73,750	.....	.....	.....
1870	19,640,000	80,000	85,000	.....	40,000	3,000	.....	.....
1871	18,560,000	165,000	125,000	.....	55,000	.....	.....	.....
1872	15,600,000	173,000	182,000	.....	45,000	.....	9,000	.....
1873	20,812,000	120,000	155,000	.....	67,500	.....	700	$703,000
1874	24,280,000	100,000	80,000	.....	.....	.....	.....	2,549,000
1875	24,600,000	.....	45,000	.....	29,000	.....	.....	4,487,000
1876	31,940,000	50,000	20,000	.....	12,500	.....	.....	5,227,000
1877	34,700,000	170,000	133,500	.....	88,500	.....	.....	9,519,000
1878	34,780,000	261,000	723,500	.....	445,000	.....	9,774,000	4,162,000
1879	24,476,000	2,240,000	2,131,000	.....	108,750	.....	9,110,000	.....
1880	16,720,000	5,062,500	6,744,500	.....	.....	.....	8,900,000	.....
1881	14,540,000	9,700,000	4,845,000	.....	.....	.....	12,760,000	.....
1882	22,500,000	1,320,000	4,845,000	.....	.....	.....	9,250,000	.....
1883	23,780,000	380,000	416,000	.....	.....	.....	6,250,000	.....
1884	18,320,000	1,242,500	885,000	.....	.....	.....	3,200,000	.....
1885	13,670,000	2,280,000	6,057,500	.....	.....	.....	1,497,000	.....
1886	.....	8,260,000	16,340,000	.....	.....	.....	750,000	.....
1887	5,660,000	8,170,000	9,560,000	.....	.....	.....	1,771,000	.....
1888	17,192,000	6,487,000	1,469,500	.....	.....	.....	657,000	.....
1889	15,494,000	4,254,000	.....	.....	.....	.....	700,000	.....
1890	16,055,000	.....	.....	.....	.....	.....	8,230,373	.....
1891	25,762,500	.....	.....	.....	.....	.....	5,296,000	.....
1892	18,603,000	1,155,000	1,492,000	.....	.....	.....	1,200,000	.....
1893	19,923,500	1,413,500	1,120,000	.....	.....	.....	100,000	.....
1894	20,971,000	250,000	279,500	.....	.....	.....	1,260,000	.....
1895	22,870,000	490,000	560,000	.....	.....	.....	400,000	.....
Total	779,882,020	57,391,060	80,985,540	186,300	1,861,255	90,232	81,135,073	26,647,000

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

from its organization, 1854, to December 31, 1895.]

SILVER.					TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Gold.	Silver.	
.....	.....	.....	.....	.....	$4,084,207	.....	$4,084,207.00
$64,975	$99,100.00	.....	.....	.....	18,008,300	$164,075.00	18,172,375.00
105,500	71,500.00	.....	$7,000.00	.....	25,306,400	184,000.00	25,490,400.00
79,000	20,500.00	.....	.....	.....	20,327,000	99,500.00	20,426,500.00
238,000	30,250.00	.....	6,000.00	.....	17,158,200	274,250.00	17,432,450.00
283,000	20,000.00	.....	6,000.00	.....	12,918,000	329,000.00	13,247,000.00
236,000	14,000.00	.....	14,000.00	.....	11,178,000	264,000.00	11,442,000.00
469,750	24,000.00	.....	17,250.00	.....	15,665,000	511,000.00	16,176,000.00
676,000	16,750.00	.....	18,075.00	.....	17,275,960	710,825.00	17,986,785.00
458,000	.....	.....	15,750.00	$5,000	19,543,400	478,750.00	20,022,150.00
329,000	5,000.00	.....	23,000.00	4,500	15,917,640	361,500.00	16,279,140.00
337,500	10,250.00	.....	17,500.00	6,000	21,213,500	371,250.00	21,584,750.00
527,000	7,000.00	.....	13,500.00	6,000	17,362,000	553,500.00	17,915,500.00
598,000	12,000.00	.....	14,000.00	6,000	18,720,000	630,000.00	19,350,000.00
580,000	24,000.00	.....	26,000.00	14,000	17,230,000	644,000.00	17,874,000.00
328,000	19,000.00	.....	45,000.00	11,500	14,028,050	403,500.00	14,431,550.00
502,000	.....	.....	5,000.00	.....	19,848,000	507,000.00	20,355,000.00
1,089,000	7,725.00	.....	32,000.00	8,050	18,905,000	1,136,775.00	20,041,775.00
290,000	20,750.00	.....	19,000.00	41,850	16,000,000	380,600.00	16,380,600.00
116,500	39,000.00	.....	45,500.00	16,200	21,154,500	920,900.00	22,075,400.00
197,000	98,000.00	.....	24,000.00	.....	24,460,000	2,868,000.00	27,328,000.00
1,600,000	170,000.00	$231,000	907,000.00	.....	24,674,000	7,395,000.00	32,069,000.00
2,264,000	2,149,000.00	.....	1,042,000.00	.....	32,022,500	10,682,000.00	42,704,500.00
2,678,000	2,249,000.00	.....	234,000.00	.....	35,092,000	14,680,000.00	49,772,000.00
6,000	35,000.00	.....	.....	.....	36,209,500	13,977,000.00	50,186,500.00
.....	.....	.....	.....	.....	28,955,750	9,110,000.00	38,065,750.00
.....	.....	.....	.....	.....	28,527,000	8,900,000.00	37,427,000.00
.....	.....	.....	.....	.....	29,085,000	12,760,000.00	41,845,000.00
.....	.....	.....	.....	.....	28,665,000	9,250,000.00	37,915,000.00
.....	.....	.....	.....	.....	24,576,000	6,250,000.00	30,826,000.00
.....	.....	.....	56,496.90	.....	20,447,500	3,256,496.90	23,703,996.90
.....	.....	.....	4,369.00	.....	22,007,500	1,501,369.00	23,508,869.00
.....	.....	.....	20,652.40	.....	24,600,000	770,652.40	25,370,652.40
.....	.....	.....	445,445.00	.....	23,390,000	2,216,445.00	25,606,445.00
.....	304,000.00	.....	172,000.00	.....	25,148,500	1,133,000.00	26,281,500.00
.....	.....	.....	97,267.80	.....	19,748,000	797,267.80	20,545,267.80
.....	.....	.....	142,307.60	.....	16,055,000	8,372,680.60	24,427,680.60
.....	554,000.00	.....	319,611.60	.....	25,762,500	6,169,611.60	31,932,111.60
514,514	241,019.75	.....	99,071.00	.....	21,250,000	2,054,604.75	23,304,604.75
370,000	363,633.75	.....	249,140.00	.....	22,457,000	1,082,773.75	23,539,773.75
2,024,345	662,205.25	.....	2.40	.....	21,500,500	3,946,552.65	25,447,052.65
554,043	441,170.25	.....	112,000.00	.....	23,920,000	1,507,213.25	25,427,213.25
17,515,127	7,707,854.00	231,000	4,249,938.70	119,100	900,396,407	137,605,092.70	1,038,001,499.70

XXXII.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Carson City

Calendar year.	GOLD.			SILVER.	
	Double eagles.	Eagles.	Half eagles.	Dollars.	Trade dollars.
1870	$75,780	$59,080	$38,375	$12,462	.....
1871	293,740	71,850	103,850	1,376	.....
1872	593,000	55,000	84,900	3,150	.....
1873	448,200	45,430	37,080	2,300	$124,500
1874	2,301,700	167,670	105,990	.....	1,373,200
1875	2,223,020	77,150	59,140	.....	1,573,700
1876	2,768,820	46,960	34,435	.....	509,000
1877	851,300	33,320	43,400	.....	534,000
1878	263,600	32,440	45,270	2,212,000	97,000
1879	214,160	17,620	86,405	756,000	.....
1880	.....	111,900	235,085	591,000	.....
1881	.....	240,150	69,430	296,000	.....
1882	782,800	67,640	414,085	1,133,000	.....
1883	1,199,240	120,000	64,790	1,204,000	.....
1884	1,622,780	99,250	82,010	1,136,000	.....
1885	189,000	.....	.....	228,000	.....
1886[1]	.....	.....	.....	.....	.....
1887[1]	.....	.....	.....	.....	.....
1888[1]	.....	.....	.....	.....	.....
1889[2]	618,900	.....	.....	350,000	.....
1890	1,824,180	175,000	269,000	2,309,041	.....
1891	100,000	1,037,320	1,040,000	1,618,000	.....
1892	545,300	400,000	414,840	1,352,000	.....
1893[2]	368,040	140,000	300,000	677,000	.....
Total	17,283,560	2,997,780	3,548,085	13,881,329	4,211,400

[1] Coinage suspended.

[2] Operations resumed October 1, 1889.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

from its organization, 1870, to December 31, 1893.]

SILVER.				TOTAL COINAGE.		
Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Gold.	Silver.	TOTA
$27,308.50	$2,085.00	.....	.....	$173,235	$41,855.50	$2
69,975.00	2,722.50	.....	$2,010.00	469,440	76,083.50	5
136,000.00	2,275.00	.....	2,400.00	732,900	143,825.00	8
168,530.00	4,115.50	.....	3,119.10	530,710	302,564.60	8
29,500.00	.....	.....	1,081.70	2,575,360	1,403,781.70	3,9
504,000.00	35,000.00	$26,658	464,500.00	2,359,310	2,603,858.00	4,9
978,000.00	1,236,000.00	2,000	827,000.00	2,850,215	3,552,000.00	6,4
710,000.00	1,048,000.00	.....	770,000.00	928,020	3,062,000.00	3,9
31,000.00	249,000.00	.....	20,000.00	341,310	2,609,000.00	2,9
.....	.....	.....	.....	318,185	756,000.00	1,0
.....	.....	.....	.....	366,985	591,000.00	9
.....	.....	.....	.....	309,580	296,000.00	6
.....	.....	.....	.....	1,264,525	1,133,000.00	2,3
.....	.....	.....	.....	1,384,030	1,204,000.00	2,5
.....	.....	.....	.....	1,804,040	1,136,000.00	2,9
.....	.....	.....	.....	189,000	228,000.00	4
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	618,900	350,000.00	9
.....	.....	.....	.....	2,268,180	2,309,041.00	4,5
.....	.....	.....	.....	2,177,320	1,618,000.00	3,7
.....	.....	.....	.....	1,360,140	1,352,000.00	2,7
.....	.....	.....	.....	808,040	677,000.00	1,4
2,654,313.50	2,579,198.00	28,658	2,090,110.80	23,829,425	25,445,009.30	49,2

[3] Coinage suspended from May 23, 1893.

XXXII.—Coinage of the Mints of the United States

RECAPITULATION.

Calendar year.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1793–1795		$27,950	$43,535			
1796		60,800	16,995		$165 00	
1797		91,770	32,030		4,390.00	
1798		79,740	124,335		1,535.00	
1799		174,830	37,255		1,200.00	
1800		259,650	58,110			
1801		292,540	130,030			
1802		150,900	265,880		6,530.00	
1803		89,790	167,530		1,057.50	
1804		97,950	152,375		8,317.50	
1805			165,915		4,452.50	
1806			320,465		4,040.00	
1807			420,465		17,030.00	
1808			277,890		6,775.00	
1809			169,375			
1810			501,435			
1811			497,905			
1812			290,435			
1813			477,140			
1814			77,270			
1815			3,175			
1816						
1817						
1818			242,940			
1819			258,615			
1820			1,319,030			
1821			173,205		16,120.00	
1822			88,980			
1823			72,425			
1824			86,700		6,500.00	
1825			145,300		11,085.00	
1826			90,345		1,900.00	
1827			124,565		7,000.00	
1828			140,145			
1829			287,210		8,507.50	
1830			631,755		11,350.00	
1831			702,970		11,300.00	
1832			787,435		11,000.00	
1833			968,150		10,400.00	
1834			3,660,845		293,425.00	
1835			1,857,670		328,505.00	
1836			2,765,735		1,369,965.00	
1837			1,035,605		112,700.00	
1838		72,000	1,600,420		137,345.00	
1839		382,480	802,745		191,622.50	
1840		473,380	1,048,530		153,572.50	
1841		656,310	380,945		54,602.50	
1842		1,089,070	655,330		85,007.50	
1843		2,506,240	4,275,425		1,327,132.50	
1844		1,250,610	4,087,715		89,345.00	
1845		736,530	2,743,640		276,277.50	

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	$204,791	$161,572.00	.....	.....	.....	$4,320.80	.....
.....	72,920	.....	$1,473.50	.....	$2,213.50	511.50	.....
.....	7,776	1,959.00	63.00	.....	2,526.10	2,226.35	.....
.....	327,536	.....	.....	.....	2,755.00	.....	.....
.....	423,515	.....	.....	.....	.....	.....	.....
.....	220,920	.....	.....	.....	2,176.00	1,200.00	.....
.....	54,454	15,144.50	.....	.....	3,464.00	1,695.50	.....
.....	41,650	14,945.00	.....	.....	1,097.50	650.50	.....
.....	66,064	15,857.50	.....	.....	3,304.00	1,892.50	.....
.....	19,570	78,259.50	1,684.50	.....	826,50	.....	.....
.....	321	105,861.00	30,348.50	.....	12,078.00	780.00	.....
.....	.....	419,788.00	51,531.00	.....	.....	.....	.....
.....	.....	525,788.00	55,160.75	.....	16,500.00	.....	.....
.....	.....	684,300.00	.....	.....	.....	.....	.....
.....	.....	702,905.00	.....	.....	4,471.00	.....	.....
.....	.....	638,138.00	.....	.....	635.50	.....	.....
.....	.....	601,822.00	.....	.....	6,518.00	.....	.....
.....	.....	814,029.50	.....	.....	.....	.....	.....
.....	.....	620,951.50	.....	.....	.....	.....	.....
.....	.....	519,537.50	.....	.....	42,150.00	.....	.....
.....	.....	.....	17,308.00	.....	.....	.....	.....
.....	.....	23,575.00	5,000.75	.....	.....	.....	.....
.....	.....	607,783.50	.....	.....	.....	.....	.....
.....	.....	980,161.00	90,293.50	.....	.....	.....	.....
.....	.....	1,104,000.00	36,000.00	.....	.....	.....	.....
.....	.....	375,561.00	31,861.00	.....	94,258.70	.....	.....
.....	.....	652,898.50	54,212.75	.....	118,651.20	.....	.....
.....	.....	779,786.50	16,020.00	.....	10,000.00	.....	.....
.....	.....	847,100.00	4,450.00	.....	44,000.00	.....	.....
.....	.....	1,752,477.00	.....	.....	.....	.....	.....
.....	.....	1,471,583.00	42,000.00	.....	51,000.00	.....	.....
.....	.....	2,002,090.00	.....	.....	.....	.....	.....
.....	.....	2,746,700.00	1,000.00	.....	121,500.00	.....	.....
.....	.....	1,537,600.00	25,500.00	.....	12,500.00	.....	.....
.....	.....	1,856,078.00	.....	.....	77,000.00	61,500.00	.....
.....	.....	2,382,400.00	.....	.....	51,000.00	62,000.00	.....
.....	.....	2,936,830.00	99,500.00	.....	77,135.00	62,135.00	.....
.....	.....	2,398,500.00	80,000.00	.....	52,250.00	48,250.00	.....
.....	.....	2,603,000.00	39,000.00	.....	48,500.00	68,500.00	.....
.....	.....	3,206,002.00	71,500.00	.....	63,500.00	74,000.00	.....
.....	.....	2,676,003.00	488,000.00	.....	141,000.00	138,000.00	.....
.....	1,000	3,273,100.00	118,000.00	.....	119,000.00	95,000.00	.....
.....	.....	1,814,910.00	63,100.00	.....	104,200.00	113,800.00	.....
.....	.....	1,773,000.00	208,000.00	.....	239,493.40	112,750.00	.....
.....	300	1,748,768.00	122,786.50	.....	229,638.70	108,285.00	.....
.....	61,005	1,145,054.00	153,331.75	.....	253,358.00	113,954.25	.....
.....	173,000	255,500.00	143,000.00	.....	363,000.00	98,250.00	.....
.....	184,618	1,484,882.00	214,250.00	.....	390,750.00	58,250.00	.....
.....	165,100	3,056,000.00	403,400.00	.....	152,000.00	58,250.00	.....
.....	20,000	1,885,500.00	290,300.00	.....	7,250.00	32,500.00	.....
.....	24,500	1,341,500.00	230,500.00	.....	198,500.00	78,200.00	.....

XXXII.—Coinage of the Mints of the United States

RECAPITULATION—Continued.

Calendar year.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1846	.....	$1,018,750	$2,736,155	.....	$279,272.50	.....
1847	.....	14,337,580	5,382,685	.....	482,060.00	.....
1848	.....	1,813,340	1,863,560	.....	98,612.50	.....
1849	.....	6,775,180	1,184,645	.....	111,147.50	$936,789
1850	$26,225,220	3,489,510	860,160	.....	895,547.50	511,301
1851	48,043,100	4,393,280	2,651,955	.....	3,867,337.50	3,658,830
1852	44,860,520	2,811,060	3,689,635	.....	3,283,827.50	2,201,145
1853	26,646,520	2,522,530	2,305,095	.....	3,519,615.00	4,384,149
1854	18,052,340	2,305,760	1,513,235	$491,214	1,896,397.50	1,657,016
1855	25,046,820	1,487,010	1,257,090	171,465	600,700.00	824,883
1856	30,437,560	1,429,900	1,806,665	181,530	1,213,117.50	1,788,996
1857	28,797,500	481,060	1,222,970	104,673	796,235.00	801,602
1858	21,873,480	343,210	439,770	6,399	144,082.50	131,472
1859	13,782,840	253,930	361,235	46,914	142,220.00	193,431
1860	22,584,400	278,830	352,365	42,465	164,360.00	51,234
1861	74,989,060	1,287,330	3,332,130	18,216	3,241,295.00	527,499
1862	18,926,120	234,950	69,825	17,355	300,882.50	1,326,865
1863	22,187,200	112,480	97,360	15,117	27,075.00	6,250
1864	19,958,900	60,800	40,540	8,040	7,185.00	5,950
1865	27,874,000	207,050	144,535	3,495	62,302.50	3,725
1866	30,820,500	237,800	253,200	12,090	105,175.00	7,180
1867	23,436,300	121,400	179,600	7,950	78,125.00	5,250
1868	18,722,000	241,550	288,625	14,625	94,062.50	10,525
1869	17,238,100	82,850	163,925	7,575	84,612.50	5,925
1870	22,819,480	164,430	143,550	10,605	51,387.50	9,335
1871	20,456,740	254,650	245,000	3,990	68,375.00	3,930
1872	21,230,600	244,500	275,350	6,090	52,575.00	3,530
1873	55,456,700	173,680	754,605	75	512,562.50	125,125
1874	33,917,700	799,270	203,530	125,460	9,850.00	198,820
1875	32,737,820	78,350	105,240	60	30,050.00	420
1876	46,386,920	104,280	61,820	135	23,052.50	3,245
1877	43,504,700	211,490	182,660	4,464	92,630.00	3,920
1878	45,916,500	1,031,440	1,427,470	246,972	1,160,650.00	3,020
1879	28,889,260	6,120,320	3,727,155	9,090	331,225.00	3,030
1880	17,749,120	21,715,160	22,831,765	3,108	7,490.00	1,636
1881	14,585,200	48,796,250	33,458,430	1,650	1,700.00	7,660
1882	23,295,400	24,740,640	17,831,885	4,620	10,100.00	5,040
1883	24,980,040	2,595,400	1,647,990	2,820	4,900.00	10,840
1884	19,944,200	2,110,800	1,922,250	3,318	4,982.50	6,206
1885	13,875,560	4,815,270	9,065,030	2,730	2,217.50	12,205
1886	22,120	10,621,600	18,282,160	3,426	10,220.00	6,016
1887	5,662,420	8,706,800	9,560,435	18,480	15,705.00	8,543
1888	21,717,320	8,030,310	1,560,980	15,873	40,245.00	16,080
1889	16,995,120	4,298,850	37,825	7,287	44,120.00	30,729
1890	19,399,080	755,430	290,640	.....	22,032.50	.....
1891	25,891,340	1,956,000	1,347,065	.....	27,600.00	.....
1892	19,238,760	9,817,400	5,724,700	.....	6,362.50	.....
1893	27,178,320	20,132,450	9,610,985	.....	75,265.00	.....
1894	48,350,800	26,032,780	5,152,275	.....	10,305.00	.....
1895	45,163,120	7,148,260	7,289,680	.....	15,297.50	.....
Total	1,255,866,820	266,275,490	220,211,355	1,619,376	28,696,302.50	19,499,337

[1] Includes $475,000 in Columbian coins.

[2] Includes $2,026,052.50 in Columbian coins.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	$169,600	$2,257,000.00	$127,500.00	.....	$3,130.00	$1,350.00	.....
.....	140,750	1,870,000.00	275,500.00	.....	24,500.00	63,700.00	.....
.....	15,000	1,880,000.00	36,500.00	.....	45,150.00	63,400.00	.....
.....	62,600	1,781,000.00	85,000.00	.....	113,900.00	72,450.00	.....
.....	47,500	1,341,500.00	150,700.00	.....	244,150.00	82,250.00	.....
.....	1,300	301,375.00	62,000.00	.....	142,650.00	82,050.00	$185,022.00
.....	1,100	110,565.00	68,265.00	.....	196,550.00	63,025.00	559,905.00
.....	46,110	2,430,354.00	4,146,555.00	.....	1,327,301.00	785,251.00	342,000.00
.....	33,140	4,111,000.00	3,466,000.00	.....	624,000.00	365,000.00	20,130.00
.....	26,000	2,288,725 00	857,350.00	.....	207,500.00	117,500.00	4,170.00
.....	63,500	1,903,500.00	2,129,500.00	.....	703,000.00	299,000.00	43,740.00
.....	94,000	1,482,000.00	2,726,500.00	.....	712,000.00	433,000.00	31,260.00
.....	.....	5,998,000.00	2,002,250.00	.....	189,000.00	258,000.00	48,120.00
.....	636,500	2,074,000.00	421,000.00	.....	97,000.00	45,000.00	10,950.00
.....	733,930	1,032,850.00	312,350.00	.....	78,700.00	92,950.00	8,610.00
.....	78,500	2,078,950.00	1,237,650.00	.....	209,650.00	164,050.00	14,940.00
.....	12,090	802,175.00	249,887.50	.....	102,830.00	74,627.50	10,906.50
.....	27,660	709,830.00	48,015.00	.....	17,196.00	5,923.00	643.80
.....	31,170	518,785.00	28,517.50	.....	26,907.00	4,523.50	14.10
.....	47,000	593,450.00	25,075.00	.....	18,550.00	6,675.00	255.00
.....	49,625	899,812.50	11,381.25	.....	14,372.50	6,536.25	681.75
.....	60,325	810,162.50	17,156.25	.....	14,662.50	6,431.25	138.75
.....	182,700	769,100.00	31,500.00	.....	72,625.00	18,295.00	123.00
.....	424,300	725,950.00	23,150.00	.....	70,660.00	21,930.00	153.00
.....	445,462	829,758.50	23,935.00	.....	52,150.00	26,830.00	120.00
.....	1,117,136	1,741,655.00	53,255.50	.....	109,371.00	82,493.00	127.80
.....	1,118,600	866,775.00	68,762.50	.....	261,045.00	189,247.50	58.50
$1,225,000	296,600	1,593,780.00	414,190.50	.....	443,329.10	51,830.00	18.00
4,910,000	.....	1,406,650.00	215,975.00	.....	319,151.70	.....	.....
6,279,600	.....	5,117,750.00	1,278,375.00	$265,598	2,406,570.00	.....	.....
6,192,150	.....	7,451,575.00	7,839,287.50	5,180	3,015,115.00	.....	.....
13,092,710	.....	7,540,255.00	6,024,927.50	102	1,735,051.00	.....	.....
4,259,900	22,495,550	726,200.00	849,200.00	120	187,880.00	.....	.....
1,541	27,560,100	2,950.00	3,675.00	.....	1,510.00	.....	.....
1,987	27,397,355	4,877.50	3,738.75	.....	3,735.50	.....	.....
960	27,927,975	5,487.50	3,243,75	.....	2,497.50	.....	.....
1,097	27,574,100	2,750.00	4,075.00	.....	391,110.00	.....	.....
979	28,470,039	4,519.50	3,859.75	.....	767,571.20	.....	.....
.....	28,136,875	2,637.50	2,218.75	.....	393,134.90	.....	.....
.....	28,697,767	3,065.00	3,632.50	.....	257,711.70	.....	.....
.....	31,423,886	2,943.00	1,471.50	.....	658,409,40	.....	.....
.....	33,611,710	2,855.00	2,677.50	.....	1,573,838.90	.....	.....
.....	31,990,833	6,416.50	306,708.25	.....	721,648.70	.....	.....
.....	34,651,811	6,355.50	3,177.75	.....	835,338.90	.....	.....
.....	38,043,004	6,295,00	20,147.50	.....	1,133,461.70	.....	.....
.....	23,562,735	100,300.00	1,551,150.00	.....	2,304,671.60	.....	.....
.....	6,333,245	[1] 1,652,136.50	2,960,331.00	.....	1,695,365.50	.....	.....
.....	1,455,792	[2] 4,003,948.50	[2] 2,583,837.50	.....	759,219.30	.....	.....
.....	3,093,972	3,667,831.00	2,233,448.25	.....	205,099.60	.....	.....
.....	862,880	2,354,652.00	2,255,390 25	.....	225,088.00	.....	.....
35,985,924	431,320,867	134,613,703.00	50,438,569.50	271,000	28,835,259.30	4,880,219.40	1,282,087.23

[1] Includes $10,005.75 in Columbian coins.

XXXII.—COINAGE OF THE MINTS OF THE UNITED STATES

RECAPITULATION—Continued.

Calendar year.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1793–1795			
1795			
1797			
1798			
1799			
1800			
1801			
1802			
1803			
1804			
1805			
1806			
1807			
1808			
1809			
1810			
1811			
1812			
1813			
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1832			
1833			
1834			
1835			
1836			
1837			
1838			
1839			
1840			
1841			
1842			
1843			
1844			
1845			
1846			

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
$10,660.33	$712.67	$71,485.00	$370,683.80	$11,373.00	$453,541.80
9,747.00	577.40	77,960.00	77,118.50	10,324.40	165,402.90
8,975.10	535.24	128,190.00	14,550.45	9 510.34	152,250.79
9,797.00	.....	205,610.00	330,291.00	9,797.00	545,696.00
9,045.85	60.83	213,285.00	423,515.00	9,106.68	645,906.68
28,221.75	1,057.65	317,760.00	224,296.00	29,279.40	571,335.40
13,628.37	.....	422,570.00	74,758.00	13,628.37	510,956.37
34,351.00	71.83	423,310.00	58,343.00	34,422.83	516,075.83
24,713.53	489.50	258,377.50	87,118.00	25,203.03	370,698.53
7,568.38	5,276.56	258,642.50	100,340.50	12,844.94	371,827.94
9,411.16	4,072.32	170,367.50	149,388.50	13,483.48	333,239.48
3,480.00	1,780.00	324,505.00	471,319.00	5,260.00	801,084.00
7,272.21	2,380.00	437,495.00	597,448.75	9,652.21	1,044,595.96
11,090.00	2,000.00	284,665.00	684,300.00	13,090.00	982,055.00
2,228.67	5,772.86	169,375.00	707,376.00	8,001.53	884,752.53
14,585.00	1,075.00	501,435.00	638,773.50	15,660.00	1,155,868.50
2,180.25	315.70	497,905.00	608,340.00	2,495.95	1,108,740.95
10,755.00	.....	290,435.00	814,029.50	10,755.00	1,115,219.50
4,180.00	.....	477,140.00	620,951.50	4,180.00	1,102,271.50
3,578.30	.....	77,270.00	561,687.50	3,578.30	642,535.80
.....	.....	3,175.00	17,308.00	.....	20,483.00
28,209.82	.....	.....	28,575.75	28,209.82	56,785.57
39,484.00	.....	.....	607,783.50	39,484.00	647,267.50
31,670.00	.....	242,940.00	1,070,454.50	31,670.00	1,345,064.50
26,710.00	.....	258,615.00	1,140,000.00	26,710.00	1,425,325.00
44,075.50	.....	1,319,030.00	501,680.70	44,075.50	1,864,786.20
3,890.00	.....	189,325.00	825,762.45	3,890.00	1,018,977.45
20,723.39	.....	88,980.00	805,806.50	20,723.39	915,509.89
.....	.....	72,425.00	895,550.00	.....	967,975.00
12,620.00	.....	93,200.00	1,752,477.00	12,620.00	1,858,297.00
14,611.00	315.00	156,385.00	1,564,533.00	14,926.00	1,735,894.00
15,174.25	1,170.00	92,245.00	2,002,090.00	16,344.25	2,110,679.25
23,577.32	.....	131,565.00	2,869,200.00	23,577.32	3,024,342.32
22,606.24	3,030.00	140,145.00	1,575,600.00	25,636.24	1,741,381.24
14,145.00	2,435.00	295,717.50	1,994,578.00	16,580.00	2,306,875.50
17,115.00	.....	643,105.00	2,495,400.00	17,115.00	3,155,620.00
33,592.60	11.00	714,270.00	3,175,600.00	33,603.60	3,923,473.60
23,620.00	.....	798,435.00	2,579,000.00	23,620.00	3,401,055.00
27,390.00	770.00	978,550.00	2,759,000.00	28,160.00	3,765,710.00
18,551.00	600.00	3,954,270.00	3,415,002.00	19,151.00	7,388,423.00
38,784.00	705.00	2,186,175.00	3,443,003.00	39,489.00	5,668,667.00
21,110.00	1,990.00	4,135,700.00	3,606,100.00	23,100.00	7,764,900.00
55,583.00	.....	1,148,305.00	2,096,010.00	55,583.00	3,299,898.00
63,702.00	.....	1,809,765.00	2,333,243.40	63,702.00	4,206,710.40
31,286.61	.....	1,376,847.50	2,209,778.20	31,286.61	3,617,912.31
24,627.00	.....	1,675,482.50	1,726,703.00	24,627.00	3,426,812.50
15,973.67	.....	1,091,857.50	1,132,750.00	15,973.67	2,240,581.17
23,833.90	.....	1,829,407.50	2,332,750.00	23,833.90	4,185,991.40
24,283.20	.....	8,108,797.50	3,834,750.00	24,283.20	11,967,830.70
23,987.52	.....	5,427,670.00	2,235,550.00	23,987.52	7,687,207.52
38,948.04	.....	3,756,447.50	1,873,200.00	38,948.04	5,668,595.54
41,208.00	.....	4,034,177.50	2,558,580.00	41,208.00	6,633,965.50

XXXII.—Coinage of the Mints of the United States

RECAPITULATION—Continued.

Calendar year.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1847			
1848			
1849			
1850			
1851			
1852			
1853			
1854			
1855			
1856			
1857			
1858			
1859			
1860			
1861			
1862			
1863			
1864			$396,950.00
1865		$341,460.00	272,800.00
1866	$737,125.00	144,030.00	63,540.00
1867	1,545,475.00	117,450.00	58,775.00
1868	1,440,850.00	97,560.00	56,075.00
1869	819,750.00	48,120.00	30,930.00
1870	240,300.00	40,050.00	17,225.00
1871	28,050.00	18,120.00	14,425.00
1872	301,800.00	25,860.00	1,300.00
1873	227,500.00	35,190.00	
1874	176,900.00	23,700.00	
1875	104,850.00	6,840.00	
1876	126,500.00	4,860.00	
1877			
1878	117.50	70.50	
1879	1,455.00	1,236.00	
1880	997.75	743.65	
1881	3,618.75	32,417.25	
1882	573,830.00	759.00	
1883	1,148,471.05	318.27	
1884	563,697.10	169.26	
1885	73,824.50	143.70	
1886	166,514.50	128.70	
1887	763,182.60	238.83	
1888	536,024.15	1,232.49	
1889	794,068.05	646.83	
1890	812,963.60		
1891	841,717.50		
1892	584,982.10		
1893	668,509.75		
1894	270,656.60		
1895	498,994.20		
Total	14,052,724.70	341,349.48	912,020.00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
$61, 836. 69	.....	$20, 202, 325. 00	$2, 374, 450. 00	$61, 836. 69	$22, 638, 611. 69
64, 157. 99	.....	3, 775, 512. 50	2, 040, 050. 00	64, 157. 99	5, 879, 720. 49
41, 785. 00	$199. 32	9, 007, 761. 50	2, 114, 950. 00	41, 984. 32	11, 164, 695. 82
44, 268. 44	199. 06	31, 981, 738. 50	1, 866, 100. 00	44, 467. 50	33, 892, 306. 00
98, 897. 07	738. 36	62, 614, 492. 50	774, 397. 00	99, 635. 43	63, 488, 524. 93
50, 630. 94	.....	56, 846, 187. 50	999, 410. 00	50, 630. 94	57, 896, 228. 44
66, 411. 31	648. 47	39, 377, 909. 00	9, 077, 571. 00	67, 059. 78	48, 522, 539. 78
42, 361. 56	276. 79	25, 915, 962. 50	8, 619, 270. 00	42, 638. 35	34, 577, 870. 85
15, 748. 29	282. 50	29, 387, 968. 00	3, 501, 245. 00	16, 030. 79	32, 905, 243. 79
26, 904. 63	202. 15	36, 857, 768. 50	5, 142, 240. 00	27, 106. 78	42, 027. 115. 28
177, 834. 56	175. 90	32, 214, 040. 00	5, 478, 760. 00	178, 010. 46	37, 870, 810. 46
246, 000. 00	.....	22, 938, 413. 50	8, 495, 370. 00	246, 000. 00	31, 679, 783. 50
364, 000. 00	.....	14, 780, 570. 00	3, 284, 450. 00	364, 000. 00	18, 429, 020. 00
205, 660. 00	.....	23, 473, 654. 00	2, 259, 390. 00	205, 660. 00	25, 938, 704. 00
101, 000. 00	.....	83, 395, 530. 00	3, 783, 740. 00	101, 000. 00	87, 280, 270. 00
280, 750. 00	.....	20, 875, 997. 50	1, 252, 516. 50	280, 750. 00	22, 409, 264. 00
498, 400. 00	.....	22, 445, 482. 00	809, 267. 80	498, 400. 00	23, 753, 149. 80
529, 737. 14	.....	20, 081, 415. 00	609, 917. 10	926, 687. 14	21, 618, 019. 24
354, 292. 86	.....	28, 295, 107. 50	691, 005. 00	968, 552. 86	29, 954, 665. 36
98, 265. 00	.....	31, 435, 945. 00	982, 409. 25	1, 042, 960. 00	33, 461, 314. 25
98, 210. 00	.....	23, 828, 625. 00	908, 876. 25	1, 819, 910. 00	26, 557, 411. 25
102, 665. 00	.....	19, 371, 387. 50	1, 074, 343. 00	1, 697, 150. 00	22, 142, 880. 50
64, 200. 00	.....	17, 582, 987. 50	1, 266, 143. 00	963, 000. 00	19, 812, 130. 50
52, 750. 00	.....	23, 198, 787. 50	1, 378, 255. 50	350, 325. 00	24, 927, 368. 00
39, 295. 00	.....	21, 032, 685. 00	3, 104, 033. 30	99, 890. 00	24, 236, 613. 30
40, 420. 00	.....	21, 812, 645. 00	2, 504, 488. 50	369, 380. 00	24, 686, 513. 50
116, 765. 00	.....	57, 022, 747. 50	4, 024, 747. 60	379, 455. 00	61, 426, 950. 10
141, 875. 00	.....	35, 254, 630. 00	6, 851, 776. 70	342, 475. 00	42, 448, 881. 70
135, 280. 00	.....	32, 951, 940. 00	15, 347, 893. 00	246, 970. 00	48, 546, 803. 00
79, 440. 00	.....	46, 579, 452. 50	24, 503, 307. 50	210, 800. 00	71, 293, 560. 00
8, 525. 00	.....	43, 999, 864. 00	28, 393, 045. 50	8, 525. 00	72, 401, 434. 50
57, 998. 50	.....	49, 786, 052. 00	28, 518, 850. 00	58, 186. 50	78, 363, 088. 50
162, 312. 00	.....	39, 080, 080. 00	27, 569, 776. 00	165, 003. 00	66, 814, 859. 00
389, 649. 55	.....	62, 308, 279. 00	27, 411, 693. 75	391, 395. 95	90, 111, 368. 70
392, 115. 75	.....	96, 850, 890. 00	27, 940, 163. 75	428, 151. 75	125, 219, 205. 50
385, 811. 00	.....	65, 887, 685. 00	27, 973, 132. 00	960, 400. 00	94, 821, 217. 00
455, 981. 09	.....	29, 241, 990. 00	29, 246, 968. 45	1, 604, 770. 41	60, 093, 728. 86
232, 617. 42	.....	23, 991, 756. 50	28, 534, 866. 15	796, 483. 78	53, 323, 106. 43
117, 653. 84	.....	27, 773, 012. 50	28, 962, 176. 20	191, 622. 04	56, 926, 810. 74
176, 542. 90	.....	28, 945, 542. 00	32, 086, 709. 90	343, 186. 10	61, 375, 438. 00
452, 264. 83	.....	23, 972, 383. 00	35, 191, 081. 40	1, 215, 686. 26	60, 379, 150. 66
374, 944. 14	.....	31, 380, 808. 00	33, 025, 606. 45	912, 200. 78	65, 318, 615. 23
488, 693. 61	.....	21, 413, 931. 00	35, 496, 683. 15	1, 283, 408. 49	58, 194, 022. 64
571, 828. 54	.....	20, 467, 182. 50	39, 202, 908. 20	1, 384, 792. 14	61, 054, 882. 84
470, 723. 50	.....	29, 222, 005. 00	27, 518, 856. 60	1, 312, 441. 00	58, 053, 302. 60
376, 498. 32	.....	34, 787, 222. 50	12, 641, 078. 00	961, 480. 42	48, 389, 780. 92
466, 421. 95	.....	56, 997, 020. 00	8, 802, 797. 30	1, 134, 981. 70	66, 934, 749. 00
167, 521. 32	.....	79, 546, 160. 00	9, 200, 350. 85	438, 177. 92	89, 184, 688. 77
383, 436. 36	.....	59, 616, 357. 50	5, 698, 010. 25	882, 430. 56	66, 196, 798. 31
11, 417, 942. 06	39, 926. 11	1, 792, 168, 680. 50	687, 607, 629. 40	27, 363, 962. 35	2, 507, 140, 272. 25

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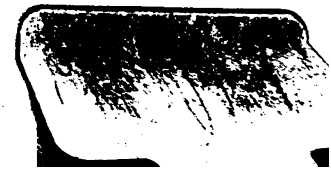
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